HOLLIS
FLOW
SOLDER
MANUAL

TDC -14A

TDL

automatic soldering system

operating manual

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cable: wavesolder

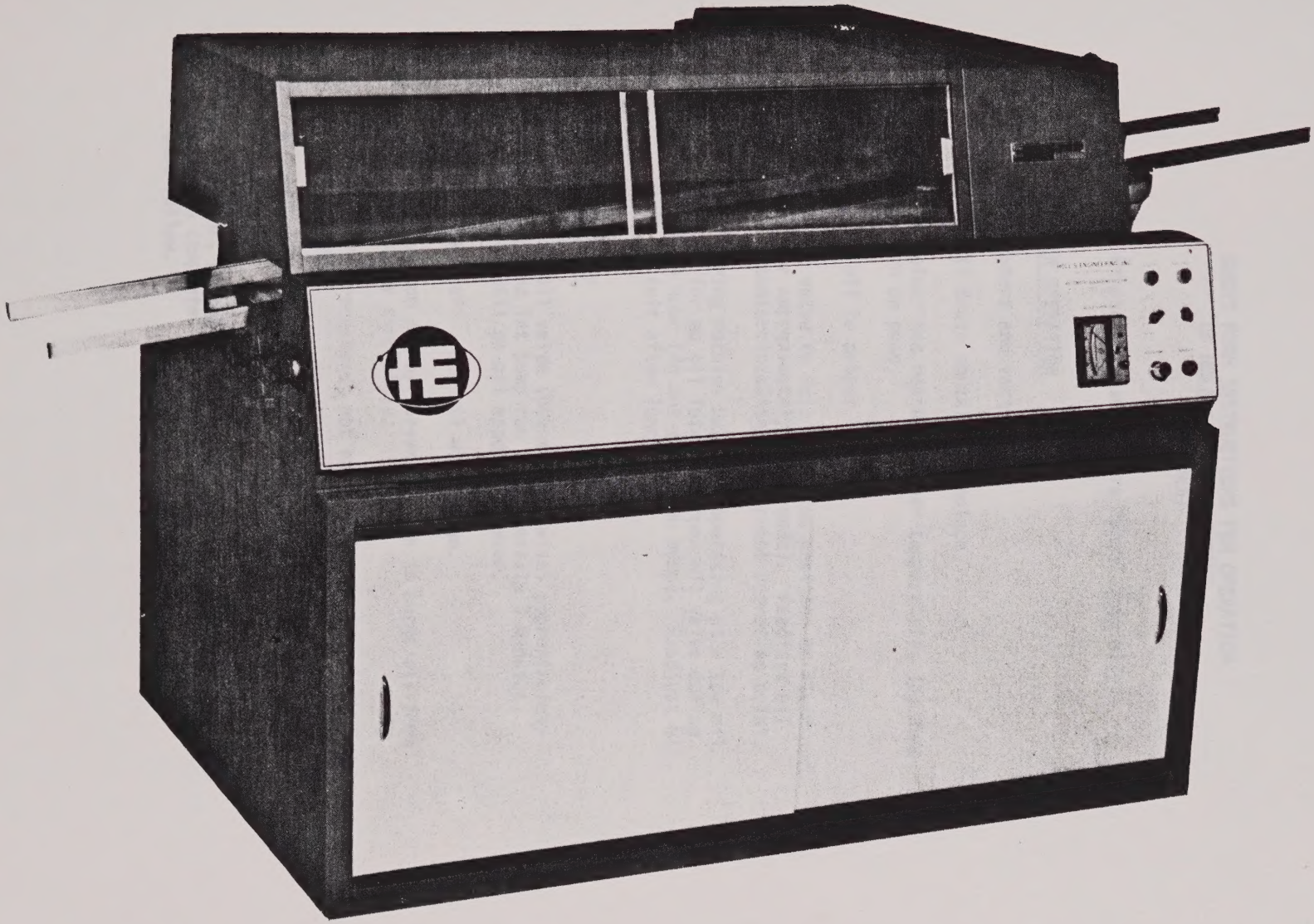
A MESSAGE TO THE OPERATOR

This instruction manual contains the information you will need to install, operate, and maintain your Hollis Wave Soldering Machine. Following these instructions carefully will yield big dividends. You will achieve the best installation, your start-up time will be shortened, and you will use the machine with maximum efficiency.

The manual describes the wave-soldering system so that operators will understand the "why" as well as the "what" of your Hollis system. Read your manual all the way through before you attempt to set up or operate the system. The Operation and Maintenance Procedures section contains logical, easy-to-perform sequences. They have been developed over years of experience with hundreds of machines. Perhaps more than any other way you will increase soldering efficiency by using these sequences.

Schematic electrical diagrams are included, as is information on accessories, recommended minimum spares, and the Hollis service policy.

Your Hollis is the best soldering system available. It will give you years of excellent performance, many soldering economies, and assured production capacity.



SHORT FORM INSTRUCTIONS FOR OPERATION OF HOLLIS WAVE SOLDERING EQUIPMENT

A Reminder: Read Entire Manual Initially

DAILY SOLDER OPERATION

1. Turn heaters and vent on.
2. Empty oil drain container, replace.
3. After solder has reached proper temperature, jog pump, then turn on pump.
4. Add new oil to proper level.
5. Open oil valve to full clockwise position to flush out sump (for approximately 30 seconds). Readjust oil valve (counterclockwise) to correct operating point.
6. If soldering machine has been operating at a low oil intermix (or no oil intermix) open oil valve during the lunch hour (do not shut down pump). Readjust oil valve to suit after lunch.

DAILY SHUT-OFF

1. Turn off oil valve (counterclockwise) approximately 5 turns and let pump run approximately 5 minutes, running until no oil appears in wave.
2. Turn pump off. Old oil will purge.
3. Turn pump on and off several times to purge oil from sump cavity completely.
4. Turn off preheaters, pot heaters (master switch), conveyor.
5. Wipe off all oil from outside surfaces.

For fluxer, preheater, pot and conveyor weekly maintenance, refer to complete operation and maintenance instructions that follow.

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SECTION I

DESCRIPTION

1-1 GENERAL

The Hollis Soldering System is designed primarily to solder the leads on printed circuit boards and other electronic components. Boards up to 24" wide are conveyed in sequence over a fluxer, one or two preheaters, and a solder wave. Movement on the conveyor is continuous and the boards pass on to the next operation in an uninterrupted flow. When the soldering machine is equipped with the standard conveyor, assembled boards are placed in carriers manually. The carriers are then set on the conveyor rails. The conveyor moves the carriers so that the leads to be soldered and the lower side of the boards are fluxed.

Printed circuit flux may be one of a wide choice of types, depending upon the requirements of a particular soldering task. Flux solutions regardless of type accomplish four actions: They clean away surface contaminants, such as oily finger prints on the board; they deoxidize the metal surfaces to be soldered so that intimate contact between leads, solder, and circuits can be achieved; they break down surface tension in the solder--and thereby improve wetting of solder on the board; and they provide a momentary gaseous atmosphere around the joints during the actual soldering so that oxidation cannot recur and inhibit bonding. By removing oxides and inhibiting further oxidation, flux plays an important part in the soldering process. Unless the surfaces to be soldered are clean and free of oxides, wetting by the molten solder will be inadequate--and the prime essential for making good solder joints is the complete wetting by the solder of the joint surfaces.

Printed circuit fluxes are classified generally as rosin or organic acid (stronger) types. Rosin fluxes are further classified as activated, mildly-activated and non-activated (water-white). (Choice of a flux is best made by consultation with the flux manufacturers.) Rosin fluxes are

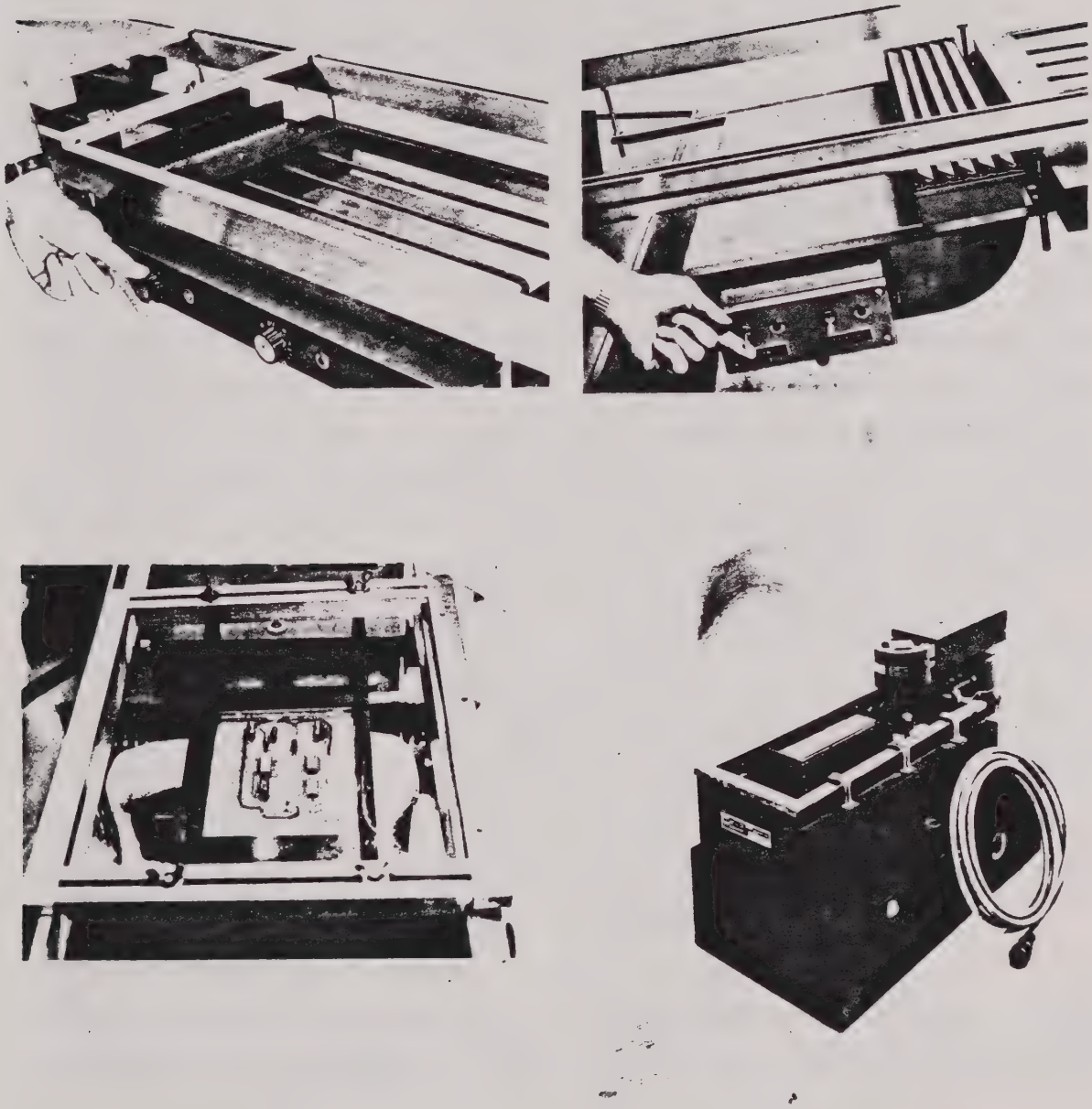


Figure 1-1 Major Components of Automatic Wave Soldering System

inert until activated by heat, while organic acid types are active until decomposed by soldering temperatures into low-activity residues.

After passing over the fluxer, the boards move over the preheater. Heating mobilizes the flux and drives off the bulk of flux solvent; otherwise the gases formed during the soldering could be trapped and might result in areas of the board not being wetted by the molten solder. Preheating also heats the boards and components so that they are not shocked by a sudden swift rise in temperature in the next step --the actual soldering itself. The preheated boards are conveyed at an inclined angle against the crest of a standing wave of molten solder which is usually intermixed with oil. The solder-oil mixture has been pumped up through a rectangular nozzle from a reservoir or solder pot, and the resulting wave is virtually oxide (dross) free. The inclined upward angle of board travel on the conveyor aids in the peel back of excess solder and prevents a residue of solder webbing and icicling on the soldered boards. The result of the clean, fluxed and preheated boards moving at an angle through the wave crest is a series of bright, shiny soldered connections. With a properly operated Hollis System, icicling and bridging (projections of solder from the joints and unwanted solder webbing between circuits) are nonexistent. (The operation section of this manual explains the techniques of combining the correct flux, preheater temperature, solder temperature, oil content, and conveyor speed to produce superior soldered joints.)

Major components of the soldering system consist of a foam or wave fluxer, a solder

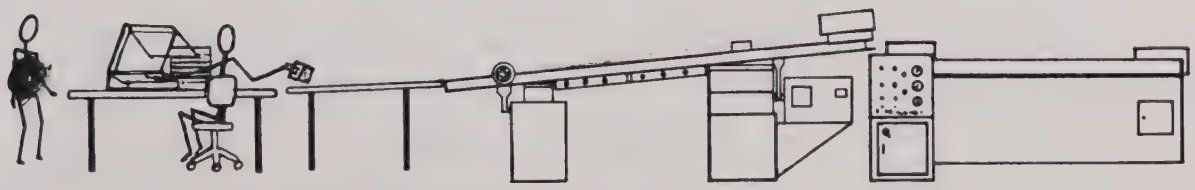


Figure 1-2 Hollis Soldering System in Operational Line with Assembly Director, Transfer Conveyor and In-Line Cleaner

base, one or two preheaters, a motorized conveyor (Fig. 1-1) and a control unit. An exhaust attachment (lip vent) is optional. A compressed air service connection is brought to the fluxer if a foam fluxer is used. Electric power is brought to the system. Provision is made for draining solder and oil separately through vents in the bottom of the solder base and for draining flux through a hose and stopcock in the flux base.

When a Hollis lip vent is attached to the solder base, a 6" diameter exhaust hose, slide-gate damper, and 600 cfm (4 inches static pressure) blower are supplied by the user. If the lip vent is not used, a 1200 cfm ducted exhaust fan, positioned above the solder base, is recommended.

Properly operated and supplied with the minimal maintenance required for Hollis machines, the system may be employed continuously to support large quantity soldering operations. Integrated with the Hollis Optoline Assembly Director, Hollis transfer conveyor, and Hollis In-Line Automatic Printed Circuit Board Cleaner, the system achieves the most efficient production results obtainable. (Fig. 1-2)

1-2 FOAM FLUXER

The one-gallon foam fluxer (Fig. 1-3) consists of a welded steel base with a corrosion-resistant polyethylene insert, an air supply line and needle-type regulator valve, a diffusing stone or porous element through which air is forced to aerate the liquid flux and produce a head of bubble foam, a flux nozzle, which channels the foam upward into a standing wave, and brushes which assist in erecting the foam column and in wiping away excess. Stone and nozzle rest in the base and are not attached. They may be lifted out for inspection and cleaning. Brushes are removable for cleaning.

The needle-type compressed air control valve and air line are attached to the base. A polyurethane line brings air from the base to the stone. Inlet air from the plant supply, filtered and regulated to a maximum pressure of 3 psi, is brought to the air line through a user-supplied water separator or air drier.

Before operation, sufficient liquid flux

of the user's choice is poured into the flux base to maintain the level between 1/4" and 3/8" above the stone. As evaporation and "drag-out" of flux occur in operation, thinner recommended by the flux manufacturer

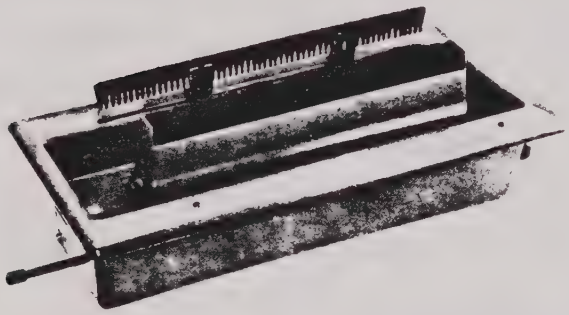


Fig. 1-3 Foam Fluxer with Nozzle, Stone, and Brushes in Place.

is added to maintain density and flux may be added to compensate for the material solids lost through drag-out.

Density monitoring is recommended because the foaming properties of the flux deteriorate if density is not maintained within the tolerance of about ±.003 g/cc specified by flux manufacturers.

1-3 SOLDER BASE

The welded steel solder base houses all subassemblies used in the actual wave soldering operation. These are: the welded steel solder pot or reservoir (insulated with fiber glass); immersion heaters which heat solder in the pot to the temperature set on the control unit; a ceramic-coated sump or fountain which forms the solder wave (solder from the pot is pumped up through the sump and stands 3/4" (18mm) above it); a centrifugal pump immersed in the solder pot and connected to the sump; a electric motor and belt which drive the pump, and an oil valve which regulates the quantity of tinning oil intermixed with the molten solder.

(Hollis 225 wave soldering fluid is recommended and will be discussed in the Operations section.) Oil may be omitted entirely by closing the valve. If oil is desired on the pot but not intermixed in the wave, a Hollis oil dripper may be fitted as an accessory.

As the solder wave formed in the sump flows over the sides of the sump it is guided be-

between the sump wall and sideplates, re-entering the solder pot well below the surface. The sideplates prevent the solder from plummeting into the oil film usually formed on the solder surface to prevent oxidation or dross formation. If the falling solder were not channeled and controlled by the sideplates it would churn up the oil, quickly degrading it by allowing oxidation and other reactions to occur. (Adjustment of the side bars within the sideplates will be covered in the Operations section.)

A solder level indicator (SLI) (Fig. 1-5) is a visual accessory to warn the operator if the solder level should drop below the minimum operating level.

The solder pump must be turned off to properly use the solder level indicator.

It is recommended that the solder level be inspected daily, preferably at the end of each working day.

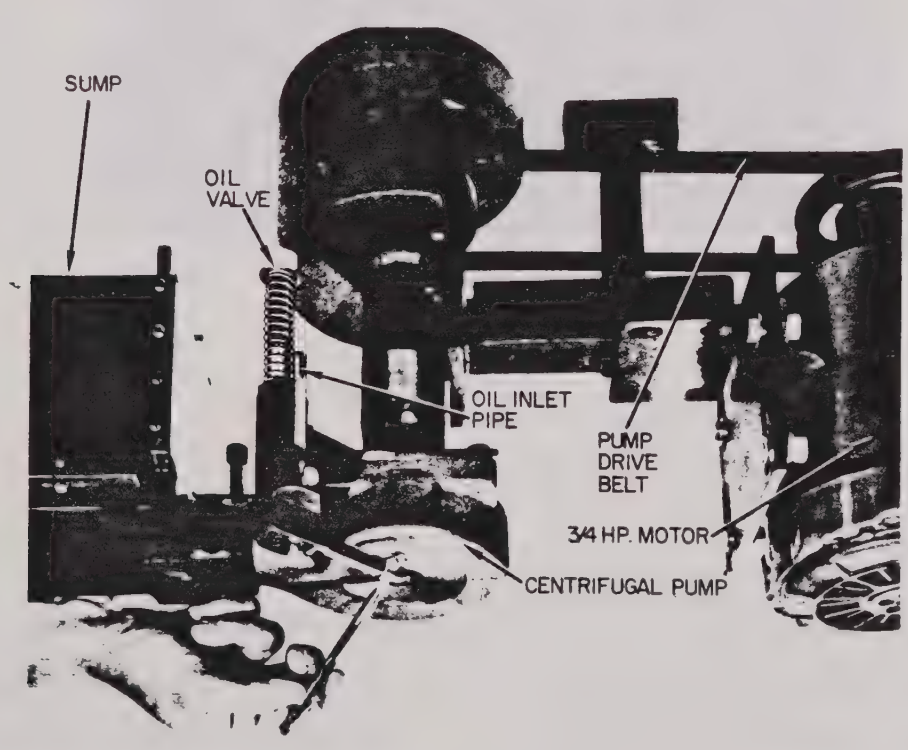


Fig. 1-4 Sump, Pump, Pump Motor Connections and Oil Control Arrangement. Pencil shows tube by which oil is intermixed with solder at pump inlet.

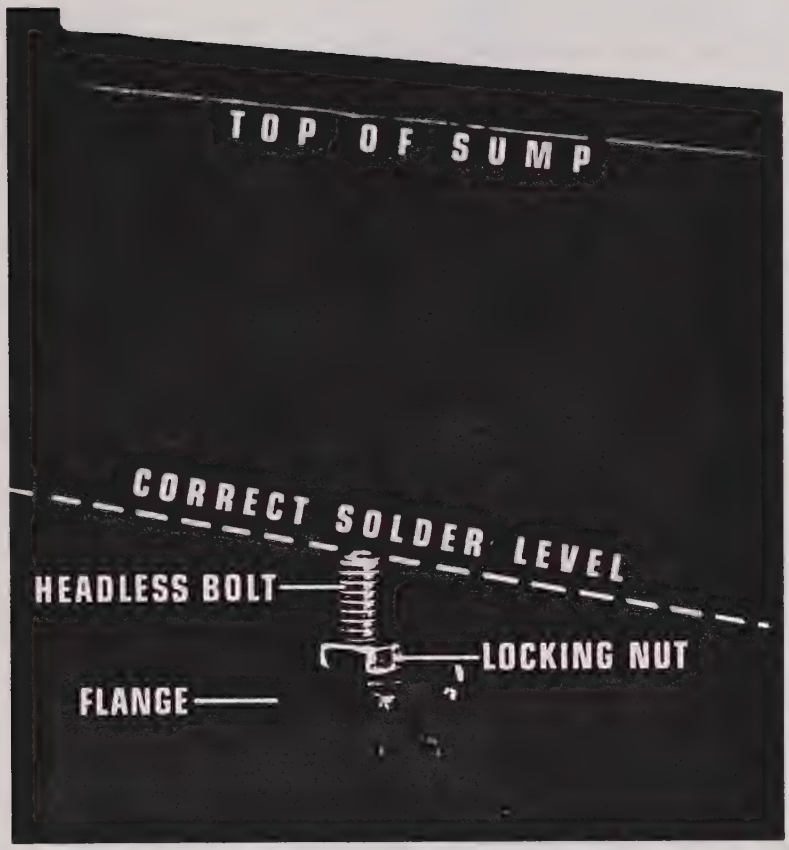


Fig. 1-5 Mechanical Solder Level Indicator

Hollis soldering systems employ a simple mechanical means of adjusting solder level correctly. The indicator is a headless bolt screwed into a flange on the solder sump in the side-plate area.

See figure above. When correctly set, the top of the bolt should be flush with the surface of the solder in the side-plate area, provided solder level is correct. The headless bolt and lock nut are normally set at our factory for correct level indication. However, this correctness shoud be checked by the user initially and periodiocally.

TO USE THE MECHANICAL INDICATOR:

1. Make sure the headless bolt is extended above the lock nut as illustrated in preceding figure. If it is not, loosen the lock nut with the wrench provided and turn the headless bolt with the Allen-head wrench also provided. Turn it until a substantial portion of the screw threads is showing above the flange. Leave the lock-nut loose.

2. Fill the solder pot initially with the correct quantity (poundage) of solder specified for your TDC.

3. With the correct quantity of solder molten in the pot, adjust the height of the headless bolt until it is flush with the molten solder's surface. Then tighten the lock-nut.

4. Maintain solder level in the sideplate area flush with the headless bolt's top. Check solder level at start-up in the morning, after solder is molten.

The solder pot at the pump end is equipped with an oil overflow compartment, into which expended oil resting on top of the molten solder is diverted when the solder pump is turned off. The used oil is then emptied by a drain through the solder pot and base into a receptacle under the solder base. Molten solder may be drained from the pot through a solder drain valve which is optional equipment. The valve is conveniently controlled from above the pot.

Your machine is equipped with an oil intermix regulating valve assembly. This valve efficiently regulates the flow of tinning oil into the impeller of the solder pump. By adjusting the valve setting with the "Tee" wrench provided, oil flow may be set from no oil in the wave to full flow. The valve is self-cleaning and will not clog.

Operation is as follows: Full counterclockwise rotation of the valve hexagonal bolt control will shut off all oil; full clockwise rotation will cause full oil intermix with the solder pumped into the sump. (See instructions for adding oil and adjusting oil valve for correct quantity.)

The patented valve functions in this way: a slot on the side of the valve admits solder

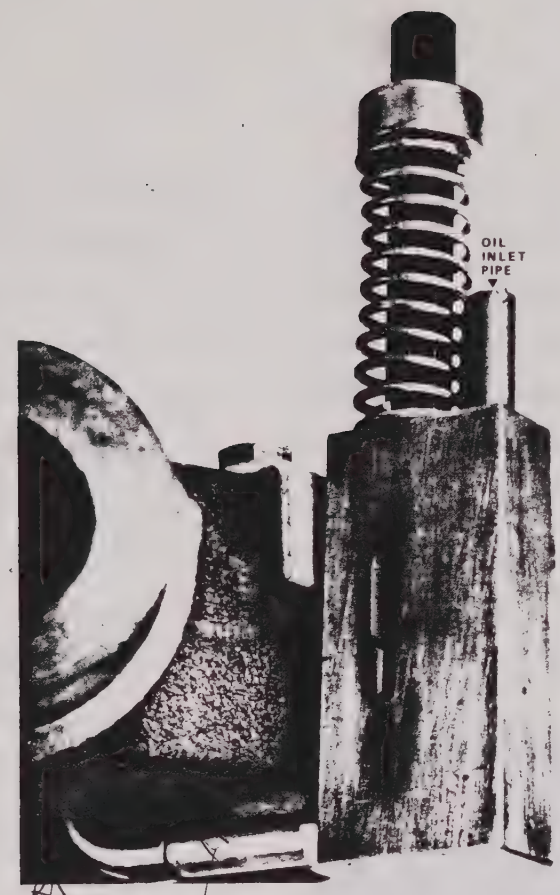


Figure 1-6 The Hollis Soldering Machine Oil Valve Assembly

to the extent that the slot is uncovered by counterclockwise rotation of the valve bolt control. The more the slot is uncovered, the more solder is allowed to enter. Oil enters the valve from the layer of oil on the pot. It is admitted through the orifice on top of the valve, next to the bolt control. Getting oil into the valve and thence into the impeller for intermixing and pumping into the sump is a function of how much solder is allowed to enter the slot on the valve side. Solder entering the slot restricts the oil's entry -- acting as a barrier because of its greater density. As the solder is restricted from entering the slot, the oil is permitted to enter and proceed to the impeller by gravity and the vacuum pull created by the rotating impeller.

When oil is completely shut off solder backfills the valve and thoroughly cleans out any oil residue and carbonization -- and prevents valve clogging.

1-4 RADIANT PREHEATERS

Each preheater consists of Incoloy tubular

heating elements, polished stainless steel reflector, cold-rolled and welded steel frame, and thermostatic heat control units with indicator lights. The unit is suspended below the conveyor, between the fluxer and the solder base, and is adjustable 3" up or down. It is vented on both sides and the thermostats are shielded from the heated area. Four 1/4-turn cam-loc fasteners allow easy removal of the reflector for cleaning and the entire heater assembly is designed for easy installation and removal. The heating unit control potentiometer is infinitely variable between high and low positions. The switch and on-off indicator light are integral to the frame. Power is supplied to each preheater from female outlets on the solder base.

1-5 MOTORIZED STANDARD CONVEYOR FOR CARRIERS

The standard conveyor is an 11-1/2 foot long, two-railed power-driven system. Conveyor width varies by model. The extruded aluminum rails, right (tall) height-adjust jack screw, left (short) adjustable-height jack screw, and a speed control are the principal components. A DC motor in the speed control unit drives, through sprockets, a chain mounted in slots along one rail. This chain is engaged by a projection on the circuit board carrier. The chain moves the carrier (Fig. 1-7) over the fluxer, preheater, and solder wave at the speed set on the speed control. Speeds are infinitely variable from 0' to 15' per minute (4572mm).

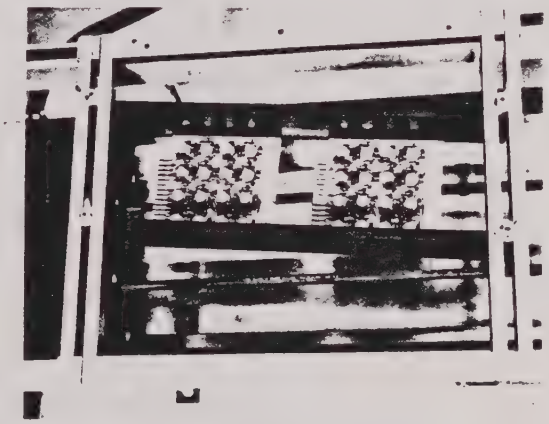
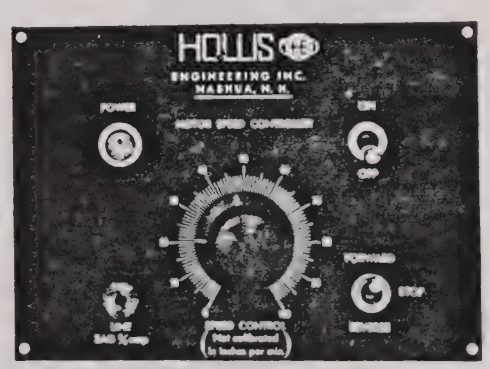


Figure 1-7 Single Carrier Moves on Standard Conveyor. Carrier with two PC boards mounted at angle to the wave to assist solder drain-off. (Boards are passing over a preheater.)

Figure 1-8 Conveyor Speed Control



On the speed control unit (Fig. 1-8) a power on-off switch is provided and a light indicates power. Additionally, a forward-reverse-stop three position switch and speed potentiometer knob control the conveyor drive. Power is supplied from the solder base.

As an option, a double-drive (drive sprocket chains in both rails) conveyor may be specified. Larger, heavier boards requiring a 14" wave width or wider may require a double-drive conveyor.

1-6 MOTORIZED CARRIERLESS CONVEYOR

The Hollis carrierless conveyor eliminates the need for circuit board carriers. Unlike the standard conveyor whose rails are fixed in width, the 12' long carrierless conveyor is adjustable from less than 1" to 2" greater than the maximum board width which the sump will accept. A handwheel and crank-type turnscrew (Fig. 1-9) adjust the width by moving one rail. Both hard-coated aluminum rails have drive chains, synchronized in speed. On these chains are mounted titanium fingers spaced 1-1/2" on centers normally, but reducible to 3/4" if required. Because both rails of the carrierless conveyor are driven, the conveyor will accept boards, without handling, from a feed conveyor--whether or not those boards are carefully aligned on the feed conveyor. The printed circuit board is inserted into the load end of the conveyor by pushing it against the spring fingers. Or, it can be pushed downward over the conveyor rails onto the titanium fingers into the locked position. Conveyor speed is infinitely adjustable from 0' to 15' per minute. When the carrierless conveyor is used, the preheaters are mounted on adjustable brackets adapted to the system and packed with the carrierless conveyor.

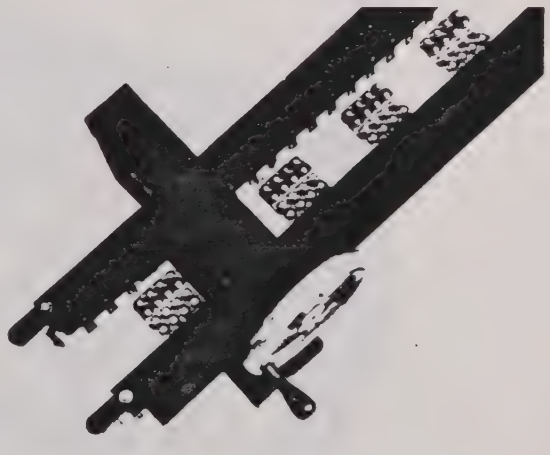


Figure 1-9 Carrierless Conveyor (PC boards are shown in the finger-type holders.)

1-7 TYPE "A" REMOTE CONTROL

This 20" x 14" x 13-1/2" unit (Fig. 1-11) controls the electrical supply to all components in the solder base, the preheaters, and the conveyor, through a master circuit breaker. A red light indicates main power on. Immersion heaters are energized when the master circuit breaker is turned on. A direct reading temperature control sets and indicates solder temperature on a 100°F to 650°F (38°C to 343°C) quadrant scale. When the preset solder temperature is reached, the heating circuit is opened. When solder temperature falls, the circuit is closed again. An amber light cycles with the immersion heaters. A safety switch turns the heaters off should the pot reach 530°F (276°C), and will not allow the solder pump to be switched on until the solder is molten (430°F) (221°C). In the "A" remote,

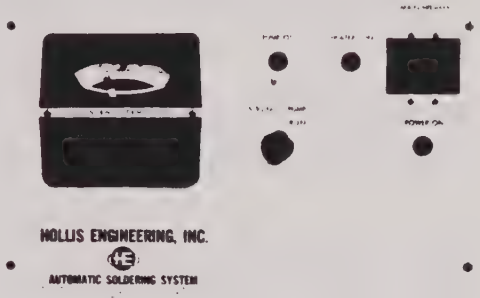


Figure 1-11 Type "A" Remote Control Panel

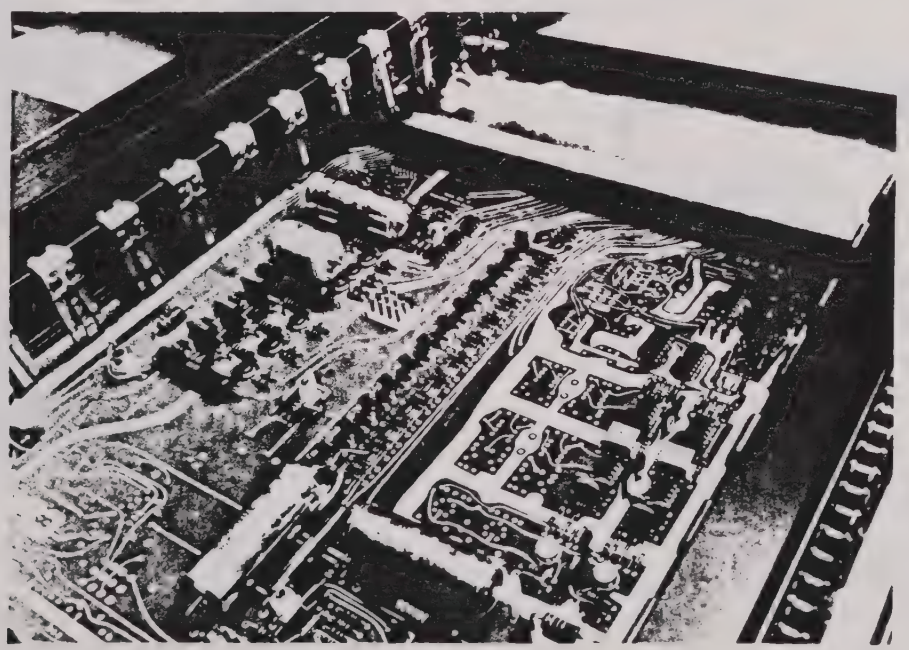


Figure 1-10 PC Board on Finger-Type Carrierless Conveyor, just before passing over wide solder wave.

one microswitch is calibrated at exactly 460°F and the other at 530°F. The 460°F side controls the voltage to the pump motor contactor only and the 530°F side controls the current to the heater contactor only. As the pot temperature increases at 460°F, the low side microswitch will close to allow the pump motor to be turned on. Should the pot "run-away", at 530°F, the high side microswitch will open, shutting down the heaters.

A 7-day skip timer (Fig. 1-12) is included for automatic immersion heater turn-on or turn-off when desired.

The "A" remote also contains power on-off switch and power indicator light.

A graphic 24-hour temperature recorder (Fig. 1-13) is optional equipment in lieu of the direct reading gauge.

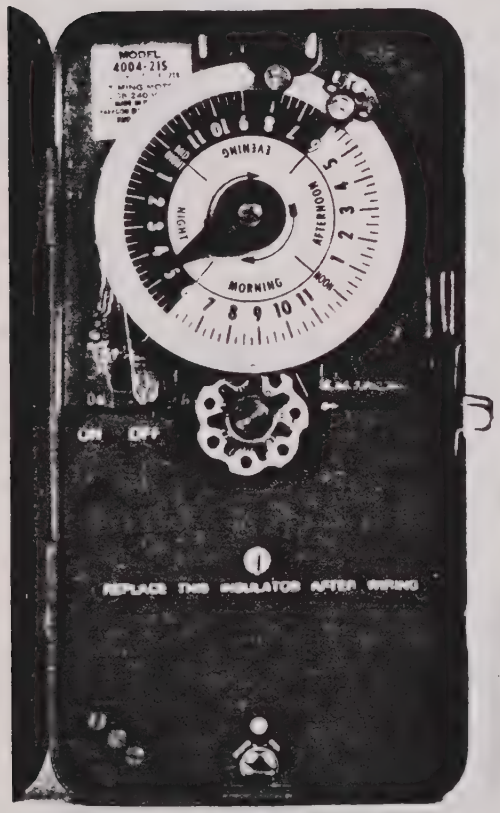


Figure 1-12 7-Day Skip-Timer Mounted on Rear of "A" Remote.

Enables operator to begin automatic heat-up of solder in pot before morning shift begins. "Skip" is provided for holidays.

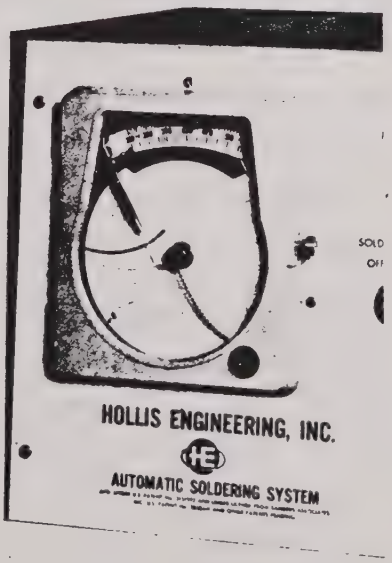


Figure 1-13 Recording 24-hour Temp. Control

The recording temperature control can serve as a record of each particular soldering operation. For each type of PC board soldering task the chart record of temperature used may be annotated with conveyor speeds, preheat temperatures, and other data about the run. Then, when this type board is run again the chart record of the original run will show the best settings for that kind of board. (The recording temperature control is also equipped with a lock.)

1-8 TYPE "B" REMOTE CONTROL

This 7" x 12" x 8" unit (Fig. 1-14) controls master power to the solder base. When the master toggle switch is "on", power is made available to the conveyor speed control and through a temperature (UE) control to the immersion heaters. A second temperature control is in series with the solder pump switch. This control protects the pump against hardened solder by de-energizing the pump circuit when solder temperature is $50^{o}F$ below the set temperature. For purposes of definition, the UE is an instrument which incorporates two microswitches, activated by the pot temperature via the capillary and bulb. In the "B" remote, one microswitch controls the power to the heater contactor keeping the pot temperature within the correct operating limits. The other microswitch is calibrated $50^{o}F$ lower and controls the power to the pump motor contactor. With a "B" remote, the pump motor can be turned on within $50^{o}F$ of the dial setting--<u>no matter what that setting is</u>. There is <u>no</u> high limit control on the "B" remote. Desired solder temperature is set on the panel. Lights indicate main power and pot heaters on-off status. A circuit breaker is required in the power input line ahead of the "B" remote.

Figure 1-14 Type "B" Remote Control Panel

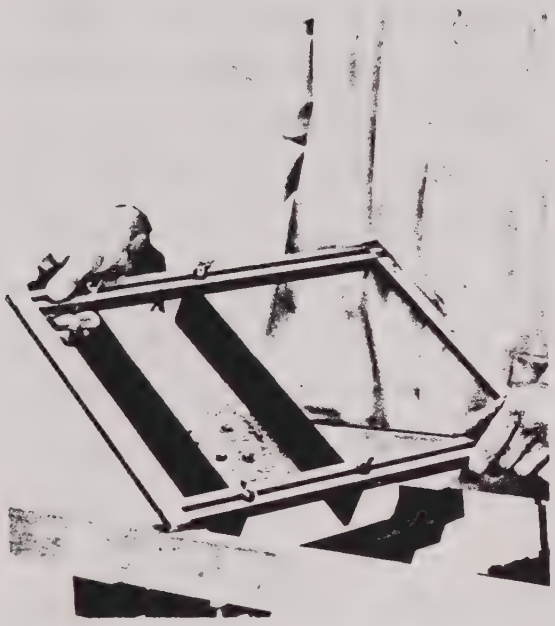


Figure 1-15 Operator Prepares to Place Single Carrier on Conveyor

1-9 CARRIERS FOR PRINTED CIRCUIT BOARDS

When the standard conveyor is used, Hollis carriers (Fig. 1-15) conduct the printed circuit boards along the conveyor. The carriers are accessories ordered in standard or special configurations. Carrier frames are rigid and anodized. Carrier rails, which are slotted to receive the boards and are adjustable in width, are of hard-coated aluminum. They resist solder pick-up and are wear-resistant to abrasive epoxy boards. Wing nuts lock the rails in position. Two- or three-railed carriers may be used for single or double rows of boards, depending on board size. Hollis carriers with an optional masking feature should be used with PC boards having contact fingers. For fast loading, Hollis carriers with hinged external rails are recommended. Extra-length Hollis carriers should be used to hold long boards to prevent warping. For special carrier requirements, a Hollis representative should be called.

1-10 ELECTRICAL SYSTEM

In a functional block, the electrical system is arranged as shown in Fig. 1-16. At the user's option, an "A"-type remote control (direct solder temperature indicating) or "B"-type (non-indicating) is selected, as are a limited choice of frequency, voltage and phase. Appropriate line power from the plant supply is brought to the remote control unit's junction box by connection to short color-coded leads supplied with

the remote. The "B" remote is not fused -- therefore a circuit-breaker is required in the plant line to the "B" remote. From the solder base to the remote, a 20'-long 15-conductor cable, also supplied with the solder base, is used (Fig. 1-1). Additionally, an external capillary connects the remote and each thermal sensing bulb in the solder pot (one with "B", two with "A" remote).

Plug receptacles are provided on the solder base for the preheaters, solder pump motor, and conveyor speed control. The immersion heaters are wired directly into the base.

Electrically, the customer may select any of six solder base combinations:

Phase	Hertz	Input Voltage	Remote Control
3	60	220	Non-indicating (B)
3	60	220	Direct-reading (A)
3	50	220	Non-indicating (B)
3	50	220	Direct-reading (A)
3	50	220/380	Non-indicating (B)
3	50	220/380	Direct-reading (A)

The conveyor speed control in every combin-

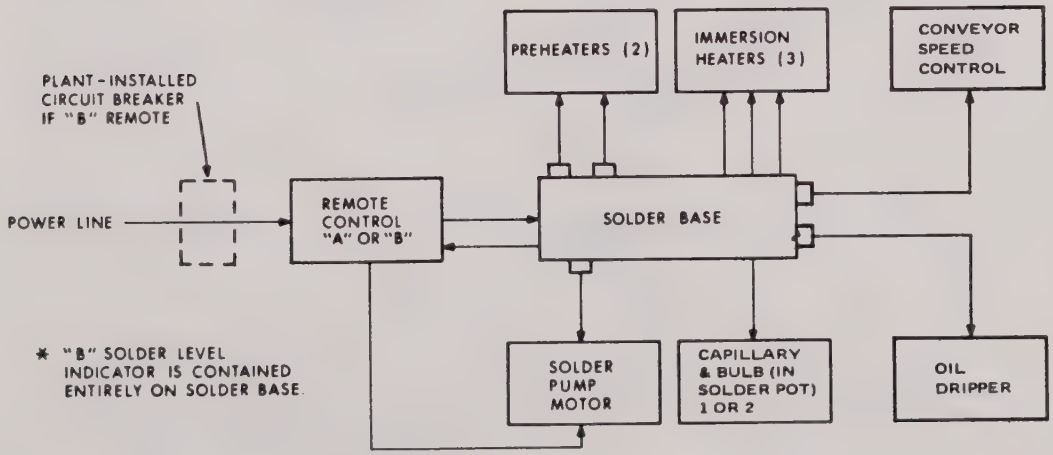

PREHEATERS (2)
IMMERSION HEATERS (3)
CONVEYOR SPEED CONTROL
PLANT-INSTALLED CIRCUIT BREAKER IF "B" REMOTE
POWER LINE
REMOTE CONTROL "A" OR "B"
SOLDER BASE
* "B" SOLDER LEVEL INDICATOR IS CONTAINED ENTIRELY ON SOLDER BASE
SOLDER PUMP MOTOR
CAPILLARY & BULB (IN SOLDER POT) 1 OR 2
OIL DRIPPER

Figure 1-16 Functional Block Diagram

ation is single phase 50/60 Hz, 115 VAC, derived from an isolation transformer on the solder base. The speed control rectifies the AC to DC for the drive motor through a silicon-controlled rectifier.

The radiant type preheaters in every combination are single phase, 50/60 Hz, 220 VAC. Hot air type preheaters may be supplied in either single or three-phase 50/60 Hz, 220 VAC.

Immersion heaters are, similarly, 50/60 Hz, 220 VAC. The standard solder pump motor, however, requires three-phase 220 VAC, 50 or 60 Hz. Or, a three-phase 220/380 VAC, 50 Hz motor may be selected in the export model.

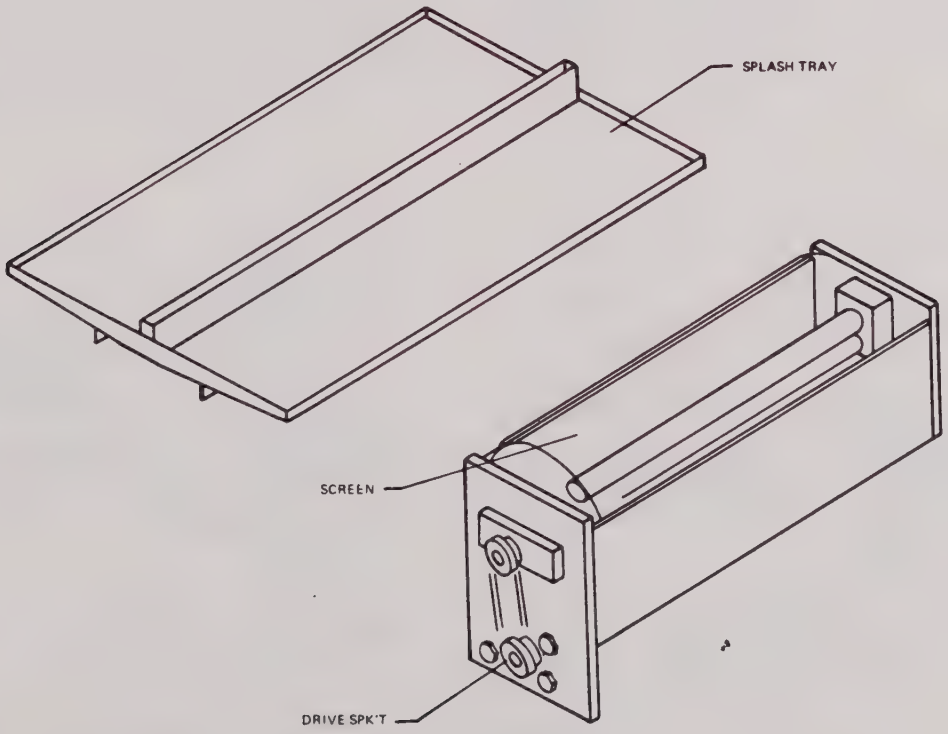


Figure 1-17 Optional spray fluxer which may be used in place of the standard foam fluxer.

SECTION II

INSTALLATION

2-1 PRE-INSTALLATION INSTRUCTIONS

For efficient operation, place the machine on a solidly constructed level floor. The maximum load will be at the solder base. Filled pot and base in 10" to 16" models weigh up to 700 lbs. (319 kg). Allow at least 18" from the nearest wall.

Bring an air service connection to the fluxer site. Electrical requirements are as shown in Fig. 2-1 and Fig. 2-2 for the TDC-10, 12 and 14 three-phase systems. Note that electric power is brought to the position selected for the control unit.

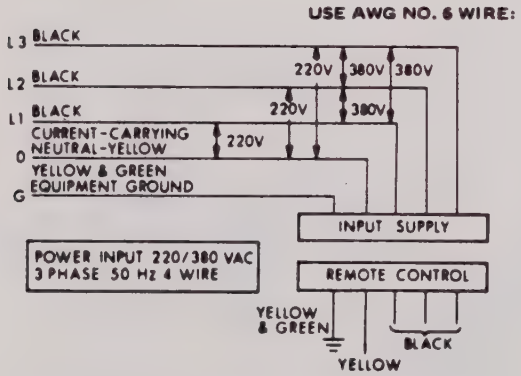


Figure 2-1 220/380 VAC, 50 Hz, 3-Phase, 4-Wire, Plus Ground

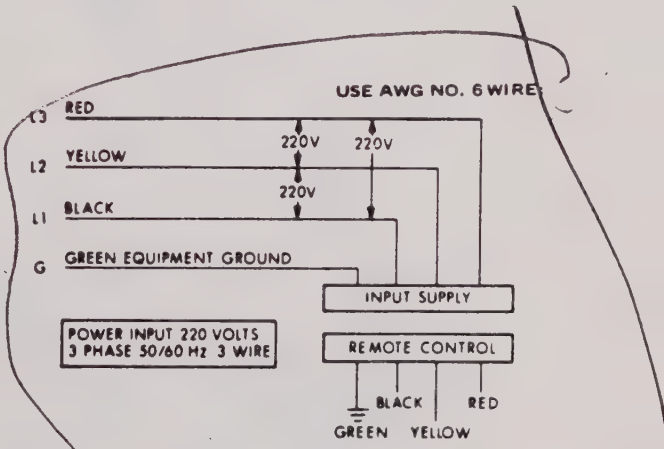


Figure 2-2 Input Power 220 VAC, 50 or 60 Hz, 3-Phase, 3-Wire Plus Ground

NOTE: Connections of Figs. 2-1 and 2-2 are made at the junction box which is located on the back side of the control unit.

With control "B", install circuit breaker in the input line between control box and power source.

The air supply requirement is for the fluxer. Install an air separator or drier and then a regulator and gauge before attaching air line to fluxer. Pressure must not exceed 3 psi (0.2 kg/cm^2) using a 78 NPT pipe connected to the 1/2" diameter fluxer air inlet pipe. A Sloan-type quick-relief connector is suggested, similar to that supplied to connect the diffusing stone input line to the fluxer air inlet pipe.

In preparation for installation, make provision for adequate ventilation of the solder pot, so that oil, flux, and other fumes created at the pot will be carried off. The Hollis lip vent is recommended. An alternate is a hood and fan over the flux base.

Fig. 2-3 shows two ventilation arrangements. If the lip vent is to be used, supply a 600 cfm blower, 6" diameter ductwork from the blower to the lip vent, and a slide gate damper in the duct. Static pressure drop across the lip vent is approximately 4 inches. Provide a rubber

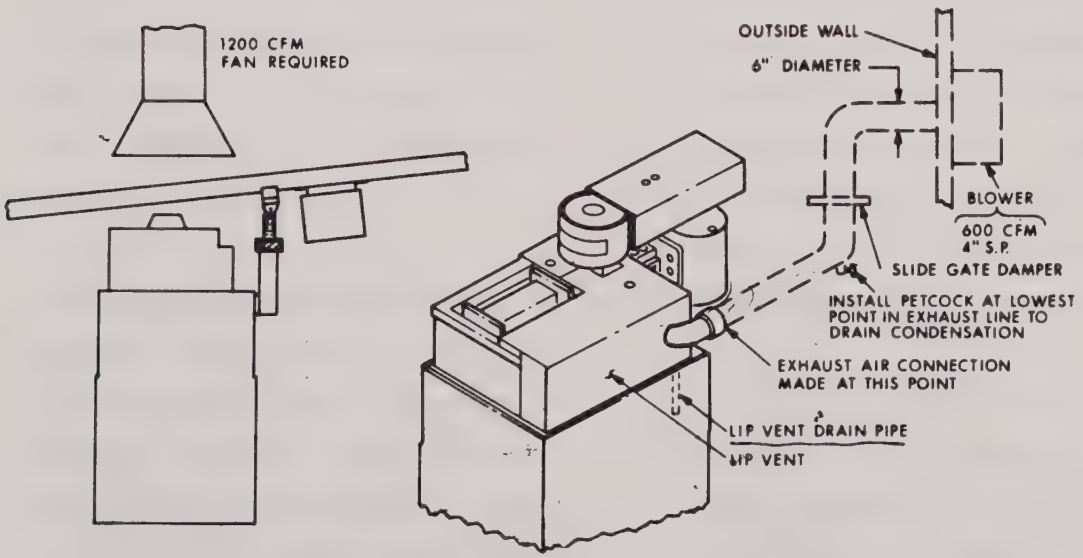


Figure 2-3 Ventilation of Solder Pot

cuff and two clamps to connect the lip vent and ductwork. Hollis recommends 6" diameter ductwork throughout for best ventilation. Total ductwork length should be kept to a minimum. The slide gate damper is necessary to control air flow properly.

2-2 INSTALLATION

While the system is being uncrated, check all parts and accessories against the packing list to make sure nothing is missing.

The following items are shipped with every system: packing list and inspection sheets. Each solder pump and sump assembly bears an inspection tag.

After the system is uncrated, inspect it to see that no part has been damaged or disarranged during shipment. Report any discrepancy immediately to your Hollis representative or to the Hollis Engineering service department at Nashua, New Hampshire.

After pre-installation preparations are completed, follow the installation steps listed below:

1. Place the flux and solder base in position. Bolt onto the solder base the remote control shelf, using bolts provided.

2. Place the remote control box on the solder base shelf.

3. Connect the solder base to the "A" or "B" remote control, using the 22-conductor cable. An amphenol connector is provided.

4. Insert the one or two solder temperature sensing heat control bulbs and capillaries (from the remote control) into the solder pot. A clamp is provided in the right rear of the solder pot to secure the capillaries and bulbs to the wall of the pot.

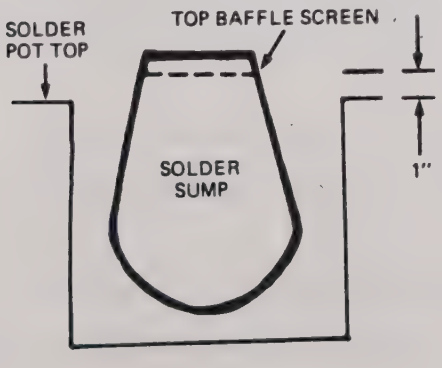
5. If a lip vent is to be used, install it to the plant duct by means of a collar and clamps as in Fig. 2-3. Now that you have checked the lip vent for fit, remove the two top sections.

6. Install drain extensions on oil drain pipe, lip vent drain, and solder drain valve pipe (optional).

7. Connect electrical power input wires to the remote control.

8. Level solder base by placing a spirit level across opposite sides of the solder pot and adjusting the four levelling bolts under the console.

9. Remove pump and sump to remove block under sump. Replace sump and pump using the top baffle as a levelling surface, level the sump from right to left and front to rear. With a straight-edge across the top baffle of the sump, adjust the sump height for one inch from straight-edge to pot top. The sump then will be positioned at the correct height. (Fig. 2-4)



10. Bolt conveyor brackets onto flux base and solder base with bolts provided. The smaller bracket goes on the flux base.

11. Lift the conveyor over the solder and flux base and drop the four conveyor jack screws into their mating mounting holes on the flux base and solder base brackets.

12. Next, connect the plant air line to the flux pot air inlet.

13. The standard conveyor is shipped with preheaters in place. Adjust the four wing nuts until the tops of the preheaters are about 1-1/2 inches below the bottoms of the conveyor rails. If a finger conveyor is used, mount the preheaters on the angle iron frame provided. Frame must be assembled. It mounts between the flux base and solder base.

14. Place diffusing stone and nozzle in position in clean flux pot. Attach diffusing stone air hose to flux base air line.

15. Install the fluxer applicator and wipe-off brushes. Be sure the wipe-off brush is mounted inside the fluxer, between the nozzle and the brush support brackets. Do not mount the wipe-off brush outside the fluxer. Mounted outside, flux may drip down onto the flux base or floor.

16. Verify that pump, preheater, and speed control switches are off. Plug the preheater, speed control, and solder pump motor electric cords into their respective receptacles on the solder base.

17. Recheck the level of flux pot. Re-adjust levelling if necessary.

18. Remove solder pump motor vee-belt guard and check tension of belt. The belt should deflect about 1 inch with finger pressure. Replace pump belt guard.

    Insure that solder drain valve is closed (fully clockwise to close).

The system is now installed -- and ready for filling with solder and flux.

2-3 FILLING THE SOLDER POT

About 450 pounds (850 pounds for systems over 16") of solder is required to fill the pot. For initial charging, it is desirable to have a supply of pellet or chip solder as well as the usual 2-pound bars on hand. Be sure the solder pot is clean. Follow this filling procedure:

1. Remove one lip vent top section if not already done, for easy access to pot.

2. With all power still off, place solder chips or pellets in the pot, in the areas that bar solder cannot reach. Then add bar solder (Fig. 2-5) until the immersion heaters and pot bottom are completely covered with solder. Be careful not to damage the capillary tubes and bulbs clamped on the pot wall.

3. Set temperature control on remote control panel.

   For direct-reading models (Fig. 2-6) turn knob located on front of temperature control until the top (red)

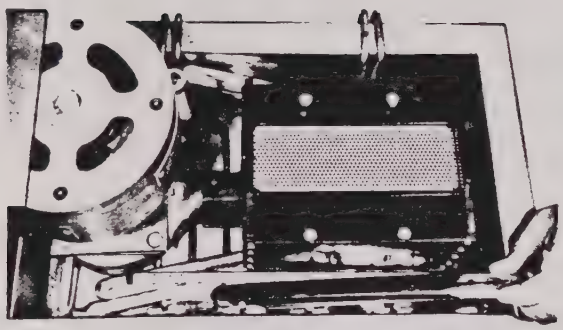


Figure 2-5 Placing Bar Solder in the Solder Pot

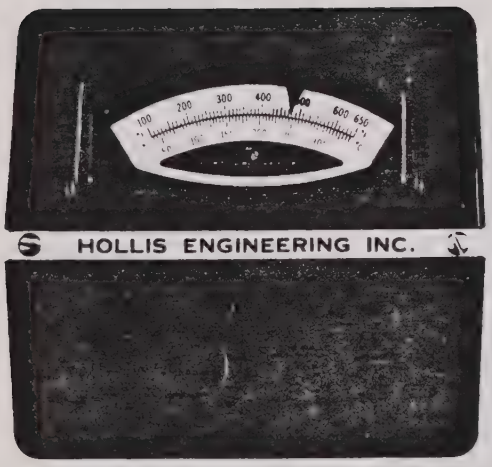


Figure 2-6 Direct Reading Temperature Control. Desired solder temperature is set on top (or red) pointer.

pointer is set at the desired solder temperature. The suggested starting temperature is 480°F (249°C). The lower (black) pointer indicates actual solder temperature. When the lower (black) pointer is in line with the top (red) pointer, the solder temperature will then be regulated and the desired solder temperature maintained.

4. For recording temperature control, remove keys from glass face and unlock front door. Depress button located on right side and open front door; depress pen lifting lever located to the left of the 310°F mark on the temperature indicating scale and remove the protective cover from the tip of the pen. Be sure to leave the pen in the lifted position.

Unscrew two (2) thumb screws located on the right side of the panel and open. Remove cap and seal from ink reservoir and install the pen capillary tube and cap. Remove small red protective cover and blow gently into ink reservoir until a drop of ink appears on the end of the pen. Re-

A NOTE ABOUT THE RECORDING TEMPERATURE CONTROL

To start ink flowing to the pen, an alternate method is available if you prefer: Remove cap and seal from ink reservoir and install the pen capillary tube and cap. Remove the small red protective cover. Lift out the reservoir bottle. Cover the reservoir vent hole and gently squeeze the sides of the ink bottle until the ink tube is filled and bubble-free ink appears on the end of the pen. Replace the ink bottle in the clamp and tape the vent cap to the inside of the case.

place ink reservoir and tape the small red vent cap to the inside of the case.

Close and secure front panel using the two (2) thumb screws. Remove excess ink with lint-free cloth. Loosen knurled knob in the center of graph enough for the graph to be turned freely. Set time on chart to time line on left side of panel. Move red arrow located at the top of the temperature scale by grasping lever, to the desired solder temperature. The green arrow at the bottom of the scale indicates solder temperature. Note: DO NOT ATTEMPT TO SET THIS INDICATOR.

Place switch located on right side of panel in the down "on" position and close front door. Pen will automatically be lowered onto graph.

5. Go to rear of "A" remote. Set bronze tripper of 7-day skip timer to "on" position. ("B" remote does not use this step.)

6. Making sure the solder pump switch on the remote panel is "off," turn vent blower and master power switch "on." The immersion heaters will now heat up and solder will begin to melt shortly.

7. WATCH YOUR HANDS!
THE POT IS NOW HOT!!

As the solder melts, add additional bars or chips until the molten level is about 1/4" to 3/8" below the oil overflow compartment wall. Cover the hot heaters with solder as quickly as possible. Do not allow exposed heaters to glow red. Turn off red heaters immediately.

8. CAUTION! Oil intermix regulator valve should be in "off" (full counterclockwise) position.

9. Make sure no part of operator's body is over the solder fountain area. When solder reaches set temperature (check with a thermometer initially) as shown on temperature indicator and as heaters are heard to cycle, turn the solder pump switch to the "jog" position. Press the switch button several times. Every time the button is pressed, the pump motor starter closes and opens, jogging the pump one time. When solder is flowing freely through the upper sump screen, turn the solder pump switch to the "run" position. Then press the button in the switch. The motor starter will latch and remain latched, and the pump motor will run continuously. (Jogging the pump reduces the possibility of solder being "geysered" should the holes in the sump baffles be plugged with cold solder.)

Solder Pump Switch

10. Now check solder for proper level.
With the pump running: The level should be 1/4" to 3/8" below the top of the oil inlet pipe (Fig. 1-4).
With the pump off: Solder should be 1/4" below oil drain located in rear of solder pot.

11. Adjust the mechanical solder level indicator.

Turn the pump switch to "off" position. Using an Allen wrench, adjust the headless bolt upward or downward until the top of the bolt is flush with the surface of the solder. Then using a 7/16" box wrench tighten the locking nut onto the flange.

WHEN ADJUSTING SLI BE CAREFUL OF YOUR HANDS! THE POT IS VERY HOT!

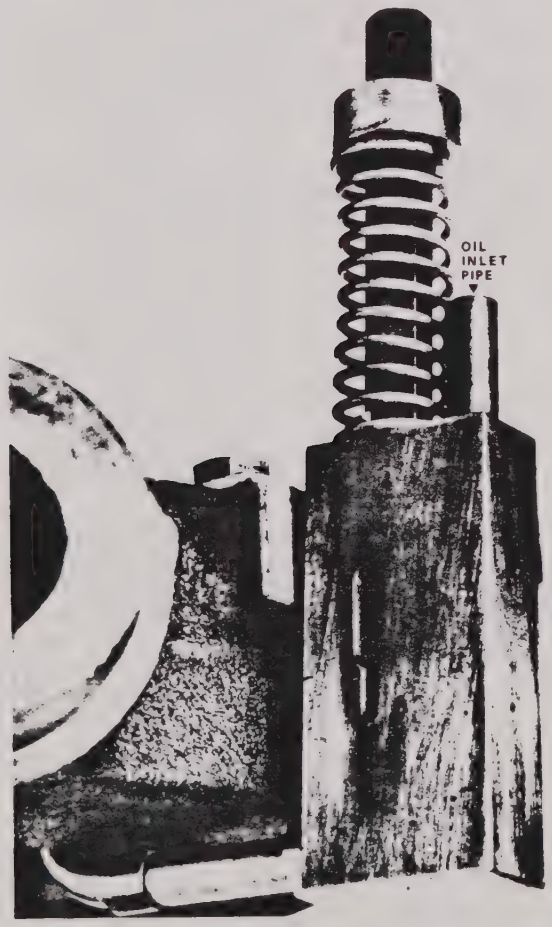


Figure 2-7 Oil valve, showing intake tube.

12. After setting SLI and turning pump back on, and it is determined that oil will be used, pour tinning oil onto the top of the solder in the pot, after skimming of dross. Add oil slowly until the oil valve intake tube (Fig. 2-7) is covered by one-quarter to one-half inch of oil or until oil has reached oil overflow drain and is running out of pot. (Keep at least 5 gallons of tinning oil [20 litres] on hand). Make sure a 10-quart metal container is under oil overflow drain.

13. Re-attach lip vent section.

14. Allow approximately five minutes to elapse after adding oil, then turn oil metering control valve (Fig. 2-8) on by turning clockwise until the desired flow of oil is reached. (NOTE: Do not attempt to turn the oil valve before the elapsed time as this could damage the valve.)

15. Now adjust the sump side bars (Fig. 2-9) so that oil is just trickling over the sump sideplates. Be sure to

AN IMPORTANT NOTE ON OPERATING PROCEDURE

Your Hollis System will give long and excellent service if you follow the procedures outlined in this manual for operation and maintenance.

There is one procedure, however, which must be followed perhaps more closely than any other if you are to get the most out of the machine and keep maintenance low. It concerns the use of tinning oil in the soldering operation. A major reason for using oil is to prevent dross. Dross blocks passages and valves, disturbs the solder wave, and causes the pump impeller and other key parts to wear excessively because it is a strong abrasive.

The soldering process can be performed under any one of four conditions: (1) oil in the wave--intermixed through the oil metering valve, (2) no oil in the wave but oil in the sump sideplates and on the pot, from the oil dripper mounted on the solder base, (3) no oil in the wave or sideplates but oil added by the operator to the pot, with oil metering and oil dripper valves closed, and finally (4) no oil at all.

Operating conditions related to your assembly procedures may preclude using oil in the wave but permit oil in the sideplates. Oil in the sideplates and pot will prevent dross build-up within the sideplate areas. If oil may not be used in the wave, it should, as a first alternative, be dripped into the sideplates continuously. If oil in the sideplates is prohibited, but oil is allowed on the pot, dross formation on the solder surface in the pot will be prevented. The sideplates must then be cleaned thoroughly every day--if there is no oil in them.

If no oil whatever is used in the solder base some dross will form on the pot and sideplates. It should be scraped away daily from within the sump and sideplate areas. Sump screens should be removed and cleaned as detailed in Fig. 3-2.

It cannot be emphasized too strongly that dross is an enemy to your machine and it makes good soldering impossible. Use tinning oil, therefore, if allowed, in the wave. It not allowed, use oil in the sideplates and on the pot, from the Hollis Oil Dripper. Denied this procedure, use oil on the pot and scrape away the dross from sideplates and sump daily. If no oil is allowed, frequently skim off dross and scrape the sump and sideplates daily.

take the same number of turns on each of the four sidebar adjusting bolts to prevent binding.

Figure 2-8 Adjusting the Oil Metering Control Valve

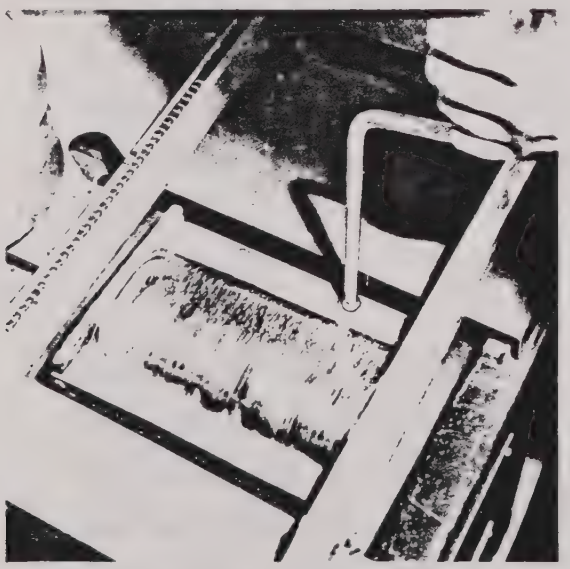


Figure 2-9 Adjusting One of the Four Adjusting Bolts which raise and lower Sump Sidebars. (Wrench is supplied with the machine.)

The solder base is now completely set to run and should need no further adjusting.

IMPORTANT NOTE: Whenever the solder pot is heated up to proper operating temperature, the solder pump should be left running. This is done to minimize carbonization of oil in the sump. Carbonized oil will degrade the wave and increase machine maintenance.

2-4 FILLING THE FOAM FLUX POT

> A WARNING ABOUT LIQUID FLUX AND THINNER.
>
> FLUX AND THINNER ARE FLAMMABLE. KEEP AWAY FROM HEAT AND OPEN FLAME. AVOID CONTACT WITH THE EYES. AVOID PROLONGED BREATHING OF VAPOR. USE WITH ADEQUATE VENTILATION. IN CASE OF CONTACT WITH EYES, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

A gallon (4 litre) can of liquid flux, carefully chosen to meet particular soldering requirements, a gallon of flux thinner should be on hand for this purpose. Make sure the fluxer is clean and level before filling. Be sure flux drain is closed.

1. Fill the flux pot with desired foaming flux until the level is approximately

1/4" over the diffusing stone. (NOTE: Before filling, flux should be checked with hydrometer or float to see that proper specific gravity, per manufacturer's specifications, has been attained. Fluxer will not foam properly if flux is not as specified by flux manufacturer.)

2. Open air-needle valve at front of fluxer until foam head on nozzle is achieved. (NOTE: The foam head should be made up of very small, evenly distributed bubbles of flux.) Do not exceed 3 psi input of diffusing stone. (Normally, less than 2 psi will achieve the desired foam head. Pressures over 3 psi will produce undesirable, large bubbles and will degrade foam's quality for fluxing.)

2-5 ADJUSTMENTS

1. Adjust the height of the preheaters below the standard conveyor by turning the four wing nuts on the threaded rods holding the preheater. Turn the wing nuts until the preheaters are approximately 1-1/2" below the bottom of the conveyor rails. Level the preheaters both lengthwise and across so they are parallel with rails.

2. Adjust the preheater temperature controls to the desired setting for the particular soldering application.

3. Place scrap PC board into a carrier and place on the conveyor rails before the flux pot. (For the carrierless conveyor, place the board in fingers.)

4. Turn the conveyor control to the "on" position and move the board until it is directly over the flux nozzle, then turn the conveyor "off."

5. Adjust the height of the conveyor until the head of foam is in contact with the bottom of the PC board. Make sure conveyor is level, side-to-side.

6. Adjust the flux wipe-off brush to touch the bottom of the PC board. This is to wipe off excess flux which might otherwise drop off into the preheater. Always be sure wipe-off brush barely touches PC board!

Once again turn on the speed control and position the board over the solder base. Make sure the board is at least 1/2" above the solder wave when the board carrier comes over the wave.

Then turn off the conveyor.

7. PERFORM THIS NEXT OPERATION RAPIDLY. DO NOT LEAVE THE BOARD IN CONTACT WITH THE WAVE LONGER THAN A FEW SECONDS! REPEAT STEP IF NECESSARY.

   Lower the conveyor at the solder base end by the height adjust knob(s), until the bottom of the PC board comes into contact with the solder wave. Lower the board into the solder wave until approximately one-half the board's thickness is submerged in the wave. AT NO TIME should more than one-half its thickness be submerged in the solder wave. Make sure the board is parallel with the wave by adjusting the conveyor height adjust knob(s) and shimming the lower side if necessary.

8. Turn the conveyor on once more and run the board to the end of the conveyor.

The system is now ready for soldering operations.

2-6 STARTING SETTINGS

As a beginning aid to production, the following running parameters are offered:

Solder Pot Temperature	480°F (249°C)
Conveyor Speed	2-1/2' to 4'/min.
Preheat Temperature on Top of Board	174°-200°F (79°-94°C)

Flux: Foam or wave, depending on fluxer type.

Oil: Hollis Soldering Fluid No. 225.

These settings will by no means fit all needs. Each soldering situation is different--and the customer must experiment for best results.

Figure 2-10 Measuring Temperature on Board-top with a Tempilstik. Heated surface is stroked. A liquid smear shows at the specified temperature rating. Temperature should be checked on laminate material only, never on plated or heat-sinked areas.

2-7 INSTALLATION CHECK BY HOLLIS

HOLLIS ENGINEERING, INC. will, at no charge to the customer, send a Factory Service Representative to check customer's installation of the machine, and go over adjustments and maintenance with operating personnel. The customer will be responsible for setting the machine up, having on hand the required operating materials, venting, and other preparations made before calling HOLLIS ENGINEERING, INC. or an authorized distributor for the installation check-out.

2-8 SUMMARY OF SUPPLIES NEEDED FOR START-UP

1. Solder: Customer's Choice

   Amount: (Min.) 500 lbs. (227 kg) (900 lbs. (409 kg) for systems over 16")

2. Flux and Thinner: Customer's Choice

   Amount: (Min.) 2 gallons of each (8 litres)

3. Oil: Hollis 225 Soldering Fluid

   Amount: (Min.) 5 gallons (20 litres)

4. Sample production boards

   Quantity: 10 samples of each type.

5. "Tempilstik" or similar board temperature indicating crayons for range of temperatures 100^{o}-250^{o}F (43^{o}-121^{o}C).

6. 10 quart metal container for oil overflow.

Filling the foam fluxer

Figure 2-11 TDC Supplies and Accessories

SECTION III

OPERATION AND MAINTENANCE PROCEDURES

3-1 INTRODUCTION

The following steps are a guide in setting up and maintaining proper operating procedures. The actions to be taken are grouped into daily and weekly procedures. If these are followed closely the results will be high machine availability, a minimum of machine down time, and efficient operation.

3-2 THE SOLDER BASE--DAILY OPERATIONS (8-Hour Workday)

1. Turn main power, pot heaters, and vent system on. 7-day skip may be programmed to do this. The time should be set to turn machine on 1 hour before work time. If skip timer is in use, leave main breaker on. (See instructions below for setting 7-day timer.)

SETTING THE 7-DAY SKIP TIMER

FIRST: Set "on" and "off" trippers on dial to desired times.

THEN: Set dial to actual time of day by rotating in direction of arrow on dial, clockwise. DO NOT turn "time" pointer.

TO OPERATE SWITCH MANUALLY: Hand trip by moving "on"-"off" lever at left of dial to desired position.

TO OPERATE SKIPPING DEVICE: To omit ON operation for any given day:

1. Insert screws in holes in cam dial for days you want to omit ON operation. Tighten screws firmly.
2. Set "days of week" dial with today's date in two o'clock position, provided "on" tripper has not passed the dial. (If it has, set tomorrow's date.)
3. Bronze tripper "on" must always start day's operation.

HOW MUCH TINNING OIL?

Normally, if you are using oil in the wave, and if you fill the solder pot to the correct oil level at starting time in the morning, you can expect to use about one U.S. gallon per 8-hour shift.

But that amount may vary, depending on your mode of operation. Operating temperature, production volume, and other parameters, may change the quantity.

THE HOLLIS OIL DRIPPER

Paragraphs 3-2 and 3-3 are based on the assumption that oil is being used in the solder wave. If, instead, the oil valve is closed and oil is added only to the pot, by means of the Hollis Oil Dripper, the following procedures apply:

1. Fill the oil dripper daily with the correct tinning oil. Add oil as required.

2. Be sure oil valve in solder base is fully closed to admit NO oil to wave.

3. Adjust solder height as when oil is used in wave.

4. As soon as solder is molten open the two oil dripper petcocks sufficiently to cause a steady drip of oil into sideplates of sump.

5. When solder pump is on, adjust sidebars for trickle of oil over the sideplates.

6. During oil dripper operations there is no need to purge pot at midday and end of shift, as new oil is constantly being added from dripper.

2. Check temperature control to see that it is set at proper temperature. Replate chart on recorder if machine is so equipped.

3. Read solder level indicator (SLI). Add solder if necessary.

4. When solder reaches set temperature (check with a thermometer initially) as shown on temperature indicator and as heaters are heard to cycle, turn the solder pump switch to the "jog" position. Press the switch button several times. Every time the button is pressed, the pump motor contactor closes and opens, jogging the pump one time. When solder is flowing freely through the upper sump screen, turn the solder pump switch to the "run" position. Then press the button in the switch. The motor starter will latch and remain latched, and the pump motor will run continuously. (Jogging the pump reduces the possibility of solder being "geysered" should the holes in the sump baffles be plugged with cold solder.)

5. Add new oil to solder pot until it begins to overflow the drain at rear of solder pot into bucket provided under the drain. (Empty the oil overflow bucket daily.)

6. Turn oil valve on full. Back off to desired setting. This should be delayed for approximately 5 minutes after new oil has been added to assure that solder in the valve has melted.

7. Adjust side bars on sump so that only oil and no solder trickles over into pot.

8. Use SLI to check solder level.

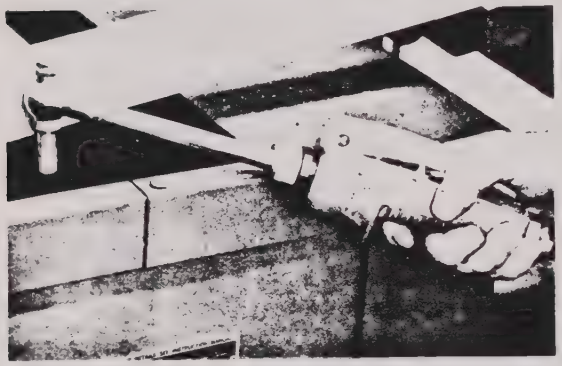
3-3 THE SOLDER BASE--DAILY SHUTDOWN

1. Turn oil valve to the off position. Using the speed wrench, clear the sideplate area of excess oil and dross, then shut the solder pump off. Wait about 3 seconds and turn the pump on, then right off. Repeat this process about 3 times. This action scrubs the inside of the sump and removes any oil that may be trapped. This also aids in removing any foreign material that may have become clogged in the baffles.

2. Using a rag or paper towel, wipe the sideplate area clean of oil and other

materials. Continue wiping until the area is clean.

3. Turn off the master switch -- unless timer is in use. If timer is used, DO NOT shut off main switch. Timer should be set to turn off the immersion heaters thirty minutes after shut down.



Adding new oil.

4. Wipe the outside of the side plates and flush off the old oil by pouring new oil into the front right hand corner of the pot. This will take about 1 quart of oil.

3-4 THE FLUXER--DAILY OPERATION (8-Hour Day)

1. Place stone and nozzle in pot. Attach stone air connection. Place applicator brushes in fluxer nozzle by slipping into position provided.

2. Place wipe-off brush in brackets on side of flux pot. Be sure brush is inside.

3. Check specific gravity of flux. If flux does not agree with the manufacturer's recommended specification, flux or thinner should be added to bring it to this point.

4. Check to see that flux level is approximately 1/4 of an inch over the top of the diffusing stone.

5. Turn on air supply. Adjust air flow to diffusing stone. This should not exceed 3 psi. Less than 2 psi should achieve good foaming action. Foam head should consist of minute bubbles giving the illusion of one solid head.

3-5 THE FLUXER--DAILY SHUTDOWN

1. Turn plant air off, close air valve on flux pot.

2. Remove applicator and wipe-off brush, and place in pan of alcohol. Brushes should be placed only in alcohol or flux thinner for cleaning. A solvent cleaner will attack the PVC brushes.

Clean the fluxer diffusing stone. Disconnect the quick-disconnect fitting on the air line and lift out the stone. Allow the stone to soak in a pan of flux thinner or alcohol overnight. Apply approximately 30 psi of air to the stone prior to use to blow out remaining thinner or resin.

3. If diffusing stone is not removed, check flux level to see that it is still 1/4" over stone. If flux level is below top of stone, it will allow resin to harden and clog pores of stone.

4. Wipe off any excess flux which may have splattered on machine. Use only alcohol or flux thinner.

3-6 THE PREHEATERS--DAILY OPERATION AND SHUTDOWN

1. Turn preheater controls to operating temperature desired.

2. At the end of day's operation, remove preheater reflector. Loosen Cam Locs on bottom of preheater so reflector will drop free. Clean with solvent and replace. FOIL

3. Clean off any flux which may have dripped on preheater case.

3-7 THE CONVEYOR--DAILY OPERATION

1. Turn speed control power switch to "on" position.

2. Turn direction switch to "forward" position.

3. Adjust conveyor speed to suit particular soldering application.

4. Check conveyor-wave relationship. With finger conveyor, check position of fingers in wave; standard conveyor, run an empty carrier checking the position of the rails in the wave. Adjust conveyor if necessary.

3-8 THE CONVEYOR--DAILY SHUTDOWN

1. Turn conveyor speed to zero.

2. Turn direction switch to middle or neutral position.

3. Turn speed control power switch to "off" position.

4. Wipe down any oil or flux which may have splattered on conveyor.

5. Clean PC board carriers in solvent. Prevent buildup of flux and oil in grooves.

3-9 THE SOLDER BASE--WEEKLY MAINTENANCE (Based on 40-Hour Work Week)

ALL STEPS BELOW EXCEPT 9 ARE PERFORMED WITH SOLDER HEATED TO MOLTEN STATE. WEAR ASBESTOS GLOVES WHEN TOUCHING HEATED AREA. USE TONGS OR CLAMPS TO LIFT HOT PARTS. HOT BAFFLE SCREENS CAN BE LIFTED OUT WITH BENT WIRE HELD WITH PLIERS.

1. Remove all the oil possible from the solder pot with the ladle provided.

2. Remove the remaining oil from the solder pot by placing paper towels or rags on top of pot and soaking it up.

3. Loosen the screw from the top forward end of the sump just enough so that the sump baffles may be removed.

4. Remove horizontal and vertical sump baffles (Fig. 3-1) and clean with wire brush to remove all carbonized oil deposits.

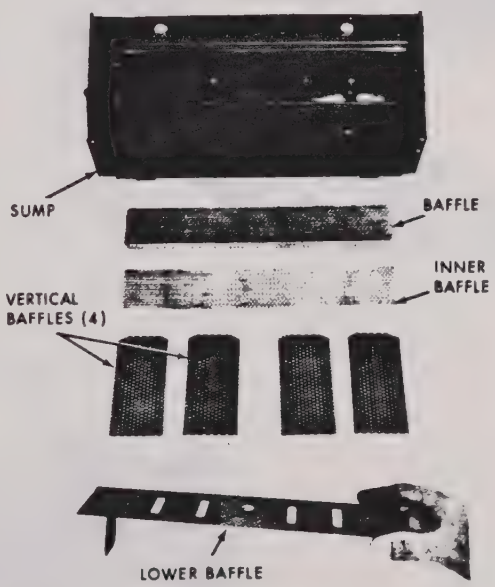
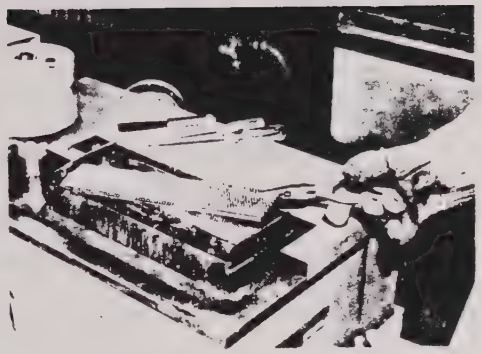
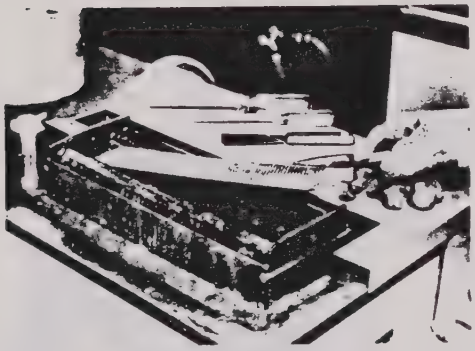


Figure 3-1 Sump Baffle Screens

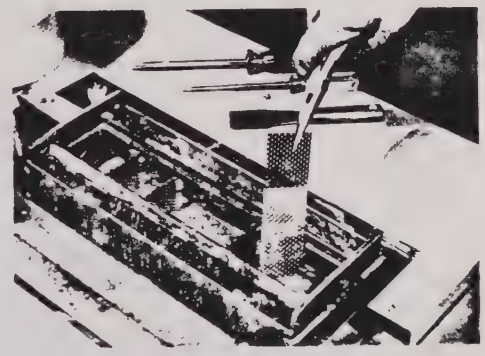
Loosening Screw in Sump



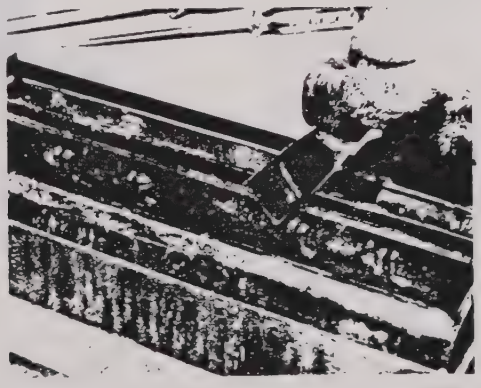
Removing Baffle



Removing Inner Baffle



Removing Vertical Baffle



Scraping Sump Above Solder

Figure 3-2 Steps in Removing Screens and Cleaning Sump

5. Using putty knife, scrape down inside and outside surfaces of the sump to remove all carbonized oil.

6. Remove all pieces of carbonized oil and any other impurities from top of solder pot with putty knife or tissues.

7. Replace sump baffles in original positions and tighten screw back in place. Be sure smooth sides of vertical baffles are toward solder inlet from pump.

8. Add oil until it runs out overflow and machine is now ready for use.

9. Grease open pump bearings (Fig. 3-3) with high temperature grease available from Hollis Engineering, Inc.

Figure 3-3 Lubricating Upper Pump Bearing (Lower bearing can be reached from rear of pump, where housing is open.)

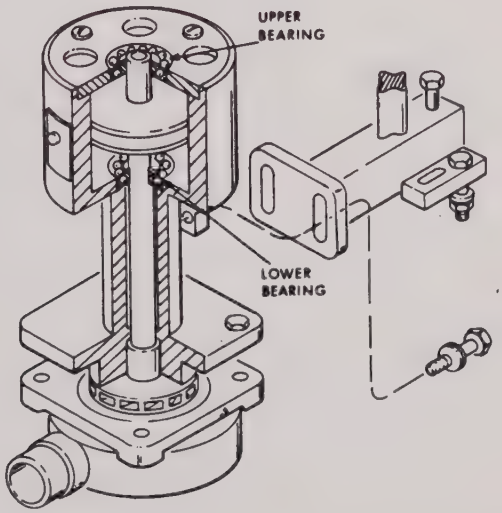


Figure 3-4 Pump Bearing

DRAINING SOLDER FROM THE POT

If solder becomes contaminated it will be necessary to drain the solder pot. Draining for this or other purposes can best be accomplished as follows:

BE CAUTIOUS!

1. Heat solder to molten temperature.
2. Place 2" deep clean stainless steel pan no more than a few inches below solder drain pipe, on a wooden block covered with asbestos.
3. Using crescent or other suitable wrench, open solder drain valve slightly by turning counterclockwise.
4. When pan is about half full close solder drain valve.
5. Remember pan is hot. Remove pan with asbestos gloves. Place on level floor, on asbestos sheet.
6. Place another clean pan under solder drain pipe and repeat cycle until pot is empty.

SECTION IV
TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	CORRECTION
Squealing in solder pump	Worn bearing	Replace bearing
	Lack of grease	Repack bearing
	Burred shaft or bushing	Inspect and remove burrs
		Replace parts as necessary
Knock in solder pump	Loose pump pulley	Tighten pump pulley
Seized pump	Obstruction in impeller	Remove obstruction and inspect pump for other damage
	Seized bearing	Remove bearing cap and inspect bearings and shaft
	Seized bushing*	Remove impeller assembly
	*Bushing must be line reamed .005 over dimension of impeller shaft	Inspect parts and replace shaft and/or bushing
Rough wave	Foreign matter on baffle screen	Remove and clean all baffle screens
	Baffle screens not completely tinned	Replace baffle screens or dip screens in a strong flux and replace same in sump
	Apertures in baffle screens not "off set"	Relocate or replace baffle screens
	Missing vertical baffle screens	Replace two vertical baffle screens
Pulsing wave	Low solder level	Add solder to proper level
	Air being drawn in through oil valve	Bring oil to proper level
	Low solder level and worn pump bushing	Replace bushing and bring solder to proper level

CONDITION	POSSIBLE CAUSE	CORRECTION
Low wave	Loose V-belt or pulley	Tighten tension on V-belt or tighten pulley on shaft
	Motor rotating in wrong direction	Correct rotation by reversing motor wiring
	Low line voltage	Install step-up transformer
	Holes in baffle screens undersized	Replace with correct baffle screens
	Incorrect pulley ratio	Refer to system manual for correct pulley ratio and replace pulleys
	Obstructed impeller vanes	Disassemble pump and clean impeller
No solder wave	Broken pump shaft	Replace shaft
	Impeller separated from pump shaft	Disassemble pump and re-pin impeller to shaft
	Loose pump pulley	Tighten pulley
	Completely clogged impeller vanes	Disassemble pump and clean impeller
Incorrect head of foam in foam fluxer	Leaky diffusing stone	Replace diffusing stone
Temperature differential in wave and temperature controller	Defective	Replace
	Controller out of calibration	Recalibrate
Slow heat up of pot	Burned out immersion heater	Replace immersion heater
No oil in wave	Too much solder in pot	Reduce solder level, bring oil to correct level.
	Loose oil intake pipe	Check oil intake pipe located in bottom of pump. See photo for proper location.
Poor control of oil in wave	Clogged oil valve	Purge oil valve by running only solder through wave

RECOMMENDED SPARE PARTS LIST

HOLLIS TDL SYSTEM

110V CONTROL CIRCUIT

ALL PRICES FOB SHIPPING POINT

The spare parts listed below should be purchased as spares. All parts have been designed for continuous use. They are not likely to give trouble. It is wise, however, to maintain at least the minimum inventory of spares to insure against work stoppage if a part is damaged or wears excessively.

ITEM	QTY.	PART NO.	DESCRIPTION
1.	1	301775	Diffusing Stone Only
2.	1	504598	Wipe Off Brush
3.	2	506024	Applicator Brush
4.	1	506604	Preheater Element
5.	1	300876	Oil Valve (12", 14", 16")
6.	1	300877	Oil Valve (10")
7.	1	302788	Motor
8.	1	502095	Immersion Heater
9.	1	505325	Pump Switch
10.	1	506002	Preheater Control
11.	1	505021	6 ft. Cap & Bulb
12.	1	502403	30A Contactor
13.	1	505324	Thermocouple 6'
14.	1	508358	Heater Coil
15.	3	504793	Fuse 3 A
16.	3	501977	Fuse 30A
17.	1	502668	Fuse 20A
18.	1	500966	Fuse 3/4A
19.	1	502563	Fuse 10A
20.	1	501945	Fuse 1A
21.	2	506945	Fuse 3A
22.	1	303138	Switch - Main Power (Red)
23.	1	303048	Switch - Conveyor (Yellow)
24.	1	505323	Temperature Control (110V)
25.	1	502421	Fuse 15A
26.	1	508716	Speed Control (Std and F.C.)
27.	1	506651	Speed Control Encased
28.	1	300193	Limit Switch - 15' Cap & Bulb

Baffles for 10" System

ITEM	QTY.	PART NO.	DESCRIPTION
1.	1	507860	Lower Horizontal Baffle
2.	4	504099	Vertical Baffle
3.	1	504100	Inside Baffle
4.	1	504101	Top Horizontal Baffle

Baffles for 12" System

1.	1	507861	Lower Horizontal Baffle
2.	4	500024	Vertical Baffle
3.	1	500027	Inside Baffle
4.	1	500546	Top Horizontal Baffle

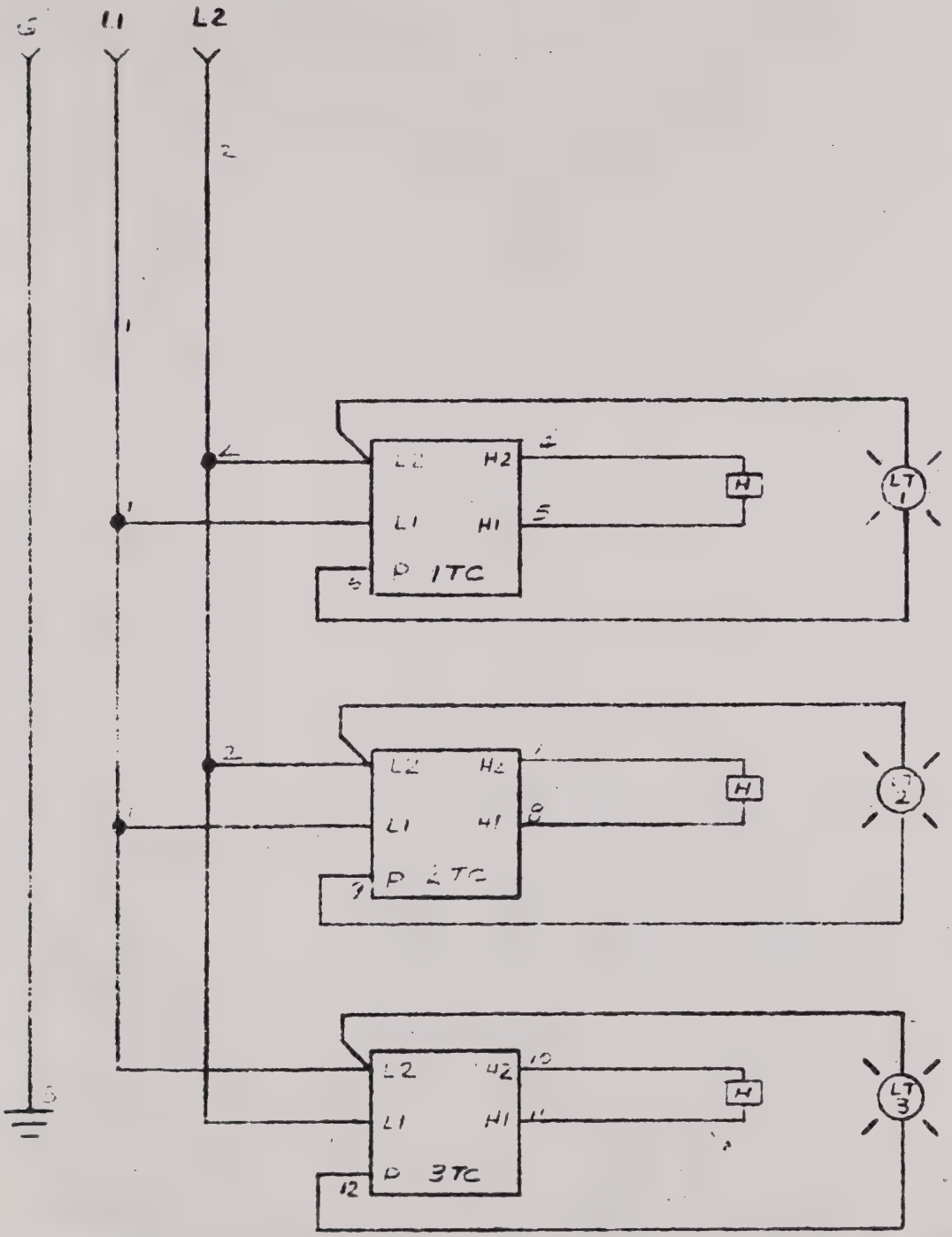
Baffles for 14" System

1.	1	507862	Lower Horizontal Baffle
2.	4	500024	Vertical Baffle
3.	1	500028	Inside Baffle
4.	1	500547	Top Horizontal Baffle

Baffles for 16" System

1.	1	507863	Lower Horizontal Baffle
2.	4	500024	Vertical Baffle
3.	1	503101	Inside Baffle
4.	1	503100	Top Horizontal Baffle

230VAC, 1PH, 50/60 HZ



MATERIAL	DR BY BM	DATE 1-26-78	HOLLIS ENGINEERING INC. NASHUA, NEW HAMPSHIRE				
HEAT TREAT	CHD BY	DATE					
FINAL PROTECTIVE FIN.	APPD BY apd	DATE 1-30-78					
SURFACE FIN. UNLESS OTHERWISE NOTED ✓ ALL OVER	SCALE		TITLE SCHEM. PIN 14-16 230VAC, 1PH, 50/60 HZ NON-REMOTE				
	No. REQD						
BREAK SHARP EDGES	UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES						
USED ON / NEXT ASSY	FRACTIONS ± 1/64	DECIMALS .XX ±.010 / .XXX ±.005	ANGLES ± 1/2°	SIZE B	DWG. NO 303148		REV

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 230	ASSY 203 231	ASSY 203 232	ASSY 203 233	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
CONVEYOR ASSEMBLY - 10"		203230		X									
CONVEYOR ASSEMBLY - 16"		203231			X								
CONVEYOR ASSEMBLY-12"		203232				X							
CONVEYOR ASSEMBLY-14"		203233					X						
RAIL - DRIVE 502235	D	505385	1	1	1	1	1						
RAIL - IDLE 502704	D	505386	2	1	1	1	1						
SPACER, CONVEYOR MTG. BRKT.	B	505388	3	1	1	1	1						
MOTOR MTG. PLATE	B	505389	4	1	1	1	1						
			5										
MOTOR	A	505501	6	1	1	1	1						
BEARING FLG'D, OILITE	A	505387	7	1	1	1	1						
SPACER, CROSS TIE	A	505305	8	4	4	4	4						
			9										
CROSS TIE, 10" (504616)	C	504617	10	2									
CROSS TIE, 12" (506925)	C	502129	11			2							
CROSS TIE, 14" (506926)	C	502130	12				2						
CROSS TIE, 16" (503117)	C	503118	13		2								
CONV. MTG. BRKT. (504681) 10"	C	504682	14	1		1	1						
			15										
SPACER-HEIGHT ADJ.	A	508747	16	8	8	8	8						
CONV. MTG. BRKT., 16" 501916	C	502737	17		1								
HEIGHT ADJUSTMENT, EXTRA SHORT	A	508748	18	2	2	2	2						
HEIGHT ADJUSTMENT, 6 1/2 LG.	A	508746	19	2	2	2	2						
KNOB	A	502433	20	4	4	4	4						
SPROCKET	A	500158	21	1	1	1	1						
SPROCKET, DRIVE	A	501809	22	1	1	1	1						
DRIP CLIP	A	501166	23	2	2	2	2						
PIN, PIVOT	A	507425	24	4	4	4	4						
MASTER LINK, 1/4 PITCH	A	500160	25	1	1	1	1						
CHAIN, 1/4 PITCH (U/M FT.)	A	500163	26	15	15	15	15						

CIN 77121

20464-1

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: STANDARD CONVEYOR ASS'Y TDL

DWG NO. 203230 THRU 203239

REV 1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 230	ASSY 203 231	ASSY 203 232	ASSY 203 233	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CLNT 77121
CHAIN, TENSION PLATE ASSEMBLY	A	507924	27	1	1	1	1						
BUSHING	A	505877	28	1	1	1	1						
THRUST WASHER	A	504366	29	4	4	4	4						
NEEDLE THRUST WASHER	A	504367	30	2	2	2	2						
			31										
6-32 x 3/8 FLAT HD SCR S.S.			32	2	2	2	2						
10-24 x 3/8 PAN HD SCR S.S.			33	3	3	3	3						
10-32 x 3/4 SOC HD CAP SCR			34	4	4	4	4						
1/4-20 x 1/2 HEX HD BOLT CAD PLATED			35	1	1	1	1						
1/4-20 x 1-1/2 FLAT HD SCR			36	2	2	2	2						
5/16-18 x 2-1/4 HEX HD BOLT CAD PLATED			37	8	8	8	8						
1/2-20 x 2 HEX HD BOLT CAD PLATED			38	2	2	2	2						
			39										
			40										
#10 FLAT WASHER, S.S.			41	3	3	3	3						
#1/4 FLAT WASHER, CAD PLATED			42	1	1	1	1						
#5/16 FLAT WASHER, CAD PLATED			43	8	8	8	8						
#1/2 FLAT WASHER, CAD PLATED			44	2	2	2	2						
JUNCTION BOX	A	508897	45	1	1	1	1						
COVER FOR JUNCTION BOX	A	500267	46	1	1	1	1						
CONNECTOR, STRAIN RELIEF	A	501782	47	1	1	1	1						
CONNECTOR, OIL TIGHT 3/8"	A	500933	48	1	1	1	1						
TERMINAL STRIP	A	506396	49	1	1	1	1						

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: STANDARD CONVEYOR ASS'Y TDL

DWG NO 203230 THRU 203239

REV A

BRUNING 204841

1976

DESCRIPTION	DWG SIZE	PART NO	ITEM NO.	ASSY 203 250	ASSY 203 251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CN NO.
16", 1½ SPACING		203250		X									77-286 A
16", 3/4 SPACING		203251			X								
LEAD SCW. LAYOUT	D	L-239		REF	REF								
RAIL - FIXED	D	505338	1	1	1								
RAIL - ADJUSTABLE	D	505340	2	1	1								
LEAD SCREW COVER, LEFT	B	508740	3	1	1								
STOP PLATE	A	502712	4	1	1								
BEARING BLOCK	B	501718	5	4	4								
OILITE BEARING	A	501763	6	5	5								
OILITE THRUST BUSHING	A	502481	7	4	4								
LEAD SCREW, DRIVE END (A502564)	B	508734	8	1	1								
NUT	B	501711	9	2	2								
ROLL PIN 3/32 DIA. x 3/4 LG.	A	501822	10	4	4								
CHAIN	A	500163	11	21	21								
LINK	A	500160	12	2	2								
OILITE THRUST BUSHING	A	502475	13	2	2								
SPROCKET	A	501809	14	4	4								
HAND WHEEL, MODIFIED (A501785)	A	501781	15	1	1								
HANDLE (FOR HAND WHEEL)	A	501786	16	1	1								
FINGER GUIDE - MIDDLE	B	505336	17	1	1								
CROSS TIE ANGLE	B	505411	18	1	1								
CROSS TIE ANGLE	B	505412	19	1	1								
FINGER GUIDE - LEFT	B	506454	20	1	1								
CROSS TIE	C	504655	21	2	2								
PIVOT PIN	A	507425	22	4	4								
KNOB	A	502433	23	4	4								
RETAINING RING	A	501808	24	4	4								
THRUST WASHER 3/8 x 5/8 x 1/8	A	501741	25	4	4								
SPYRALIGN PRESS BEARING	A	502356	26	4	4								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDL 16"

DWG NO. 203250 THRU 203259

REV A

	DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 250	ASSY 203 251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASS	ASSY CN NO.	
	TENSION PLATE	A	501704	27	2	2								77-286	A
	RIVET (NOT SHOWN)	A	502507	28	2	2									
	10-32 x 1/4 LG. SET SCREW		CUP POINT	29	2	2									
	SPROCKET ASSEMBLY	A	508104	30	2	2									
	TENSION PLATE	A	501705	31	2	2									
	STOP PLATE	A	502711	32	1	1									
	LEAD SCREW COVER	B	504667	33	1	1									
A	LEAD SCREW, IDLE END (A502564)	B	504664	34	1	1									
	CROSS TIE ANGLE	B	504662	35	1	1									
	CROSS TIE ANGLE	B	504660	36	1	1									
	FINGER GUIDE - RIGHT	B	506453	37	1	1									
	MTG. BRKT. - SPACER	B	505394	38	1	1									
	HEIGHT ADJUSTMENT 10 1/2"	A	508749	39	2	2									
	CHAIN GUARD	B	505339	40	1	1									
	TENSION ARM COVER	B	504281	41	2	2									
	ANGLE BRACKET	A	501849	42	5	5									
A	RIVET	A	502812	43	640	1280									
A	CONVEYOR CLIP ASSEMBLY	A	507479	44	320	640									
	CONVEYOR MOUNTING BRACKET	C	502737	45	1	1									
	CHAIN (U/M-FT)	A	504641	46	37	37									
	LINK, MASTER	A	504870	47	2	2									
	CHAIN DRIVE MECHANISM	C	301329	48	1	1									
	OILITE BEARING	A	501764	49	4	4									
	SHOULDER SCREW	A	504276	50	2	2									
	IDLER SPROCKET	A	504275	51	2	2									
	NUT	A	501845	52	1	1									
A	LEAD SCREW (A502564)	B	504666	53	1	1									
	BEARING BLOCK	A	501846	54	1	1									
	COLLAR	A	502035	55	1	1									
	CHAIN GUARD - ADJ. RAIL	B	505410	56	1	1									
	ANTI-DRIP BLOCK	A	502647	57	2	2									
	ANTI-DRIP BLOCK	A	502648	58	2	2									
	BEARING	A	504015	59	2	2									
	THRUST WASHER	A	501742	60	1	1									
	THRUST WASHER	A	504366	61	8	8									
	NEEDLE THRUST WASHER	A	504367	62	4	4									
	TENSION ARM	A	504188	63	2	2									
	ROLL PIN	A	503105	64	1	1									

1976

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 250	ASSY 203 251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CN NO.
F.C. MANUAL LOADING ASSEMBLY	A	202218	65	1	1								77-286 A
LOCKING BLOCK		504591	66	4	4								
CHAIN GUIDE LEFT, REAR	B	504611	67	1	1								
CHAIN GUIDE RIGHT	B	506455	68	1	1								
CHAIN GUIDE (RIGHT REAR)	B	504649	69	1	1								
CHAIN GUIDE LEFT	B	506456	70	1	1								
HEIGHT ADJUSTMENT 3 3/4"	A	508748	71	2	2								
SPACER-HEIGHT ADJ.	A	508747	72	8	8								
(A) ROLLPIN, STEEL, 3/16 DIA x 1-1/8	A	503105	73	1	1								
(A) SETSCREW, HEX SOCKET, CUP PT, STEEL, BLK OXIDE, 10-32x1/4 (400736 REF)			74	1	1								
			—										

203641

HOLLIS ENG. INC. NASHUA, NEW HAMPSHIRE	TITLE: FINGER CONVEYOR - TDL 16"	DWG NO 203250 THRU 203259	REV A

SHEET 3 OF 3

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 220	ASSY 203 221	ASSY 203 222	ASSY 203 223	ASSY 203 224	ASSY 203 225	ASSY	ASSY	ASSY	ASSY
TDL-16 230V 60 HZ 3 PH SC		203220		X									
TDL-16 230V 60 HZ 3 PH FC		203221			X								
TDL-16 230V 50 HZ 3 PH SC		203222				X							
TDL-16 230V 50 HZ 3 PH FC		203223					X						
TDL-16 380V 50 HZ 3 PH SC		203224						X					
TDL-16 380V 50 HZ 3 PH FC		203225							X				
ARR. DWG (REF)	B	SK-3513											
FOAM FLUXER	A	302909	1	1	1	1	1	1	1				
SUMP	A	300656	2	1	1	1	1	1	1				
PUMP DOM	A	300638	3	1	1								
OIL VALVE	A	300882	4	1	1	1	1	1	1				
MOTOR ASSY 60 HZ	A	302782	5	1	1								
SOLDER DRAIN VALVE	A	508111	6	1	1	1	1	1	1				
FRAME (WELDMENT)	C	508720	7	1	1	1	1	1	1				
SCHEMATIC 380 VAC, 2 HP.	D	302908	8					0	0				
SCHEMATIC 230 VAC 2 HP.	D	302907	9	0	0	0	0						
PUMP FOREIGN		300639	10			1	1	1	1				
MOTOR ASSY 50 HZ		302783	11			1	1	1	1				
SOLDER POT (505311)	C	508725	12	1	1	1	1	1	1				
IMMERSION HEATERS	D	502095	13	3	3	3	3	3	3				
SIDE PLATE, SOL. BASE	B	502187	14	1	1	1	1	1	1				
BRACKET - TERM. MTG.	B	502616	15	1	1	1	1	1	1				
GASKET - IMM. HEATER	A	500207	16	3	3	3	3	3	3				
INSULATION	A	502472	17	1	1	1	1	1	1				
KNOB - HINGED HOOD	A	500935	18	1	1	1	1	1	1				
TERMINAL BLOCK	A	501014	19	37	37	37	37	37	37				
END BLOCK	A	500972	20	2	2	2	2	2	2				
RECEPTACLE - MOTOR	A	502037	21	1	1	1	1	1	1				
RECEPTACLE - CONVEYOR	A	505312	22	1	1	1	1	1	1				
TAG, MOTOR ROTATION	A	501998	23	1	1	1	1	1	1				
TAG, CLEANING	B	502998	24	1	1	1	1	1	1				
TAG, LIP VENT INST.	B	504461	25	1	1	1	1	1	1				

C/N 77-3

BOLLING 20164-1

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-16 SERIES

DWG NO. 203220 THRU 203229

REV D

CN77-183 REV A

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 220	ASSY 203 221	ASSY 203 222	ASSY 203 223	ASSY 203 224	ASSY 203 225	ASSY	ASSY	ASSY	ASSY
TAG, SERIAL NO.	A	500085	26	1	1	1	1	1	1				
STOP SWITCH 120V, N.C. M.C.	A	303041	27	1	1	1	1	1	1				
NAMETAG, EMERGENCY STOP	A	509166	28	1	1	1	1	1	1				
FITTING, SEALTIGHT 3/8 ST.	A	500933	29	1	1	1	1	1	1				
LEVELING FEET	A	502531	30	6	6	6	6	6	6				
			31										
BRACKET - THERMO - COUPLE	A	508297	32	1	1	1	1	1	1				
CLAMP, CAPILLARY	A	500069	33	3	3	3	3	3	3				
			34										
SOL. POT HOOD	D	508731	35	1	1	1	1	1	1				
HINGED HOOD	D	508719	36	1	1	1	1	1	1				
HOOD MTG. ANGLE	B	508744	37	1	1	1	1	1	1				
JUNCTION BOX (POWER)	B	507429	38	1	1	1	1	1	1				
JUNCTION BOX - COVER	B	507481	39	1	1	1	1	1	1				
CONTROL BOX	D	508728	40	1	1	1	1	1	1				
CONTROL BOX - COVER	B	508736	41	1	1	1	1	1	1				
COMPONENT PANEL- LEFT	C	508722	42	1	1	1	1	1	1				
COMPONENT PANEL- RIGHT	C	508723	43	1	1	1	1	1	1				
CONTROL PANEL	C	508721	44	1	1	1	1	1	1				
TIMER 60 HZ	A	505050	45	1	1								
TIMER 50 HZ	A	505051	46			1	1	1	1				
TRANSFORMER .25KVA	A	504774	47	1	1	1	1	1	1				
MOTOR STARTER 3P. 120V COIL	A	506006	48	1	1	1	1	1	1				
CONTACTOR 3P. 120V COIL 30A	A	502403	49	2	2	2	2	2	2				
SPEED CONTROL (STD. & F/C)	A	508716	50	1	1	1	1	1	1				
SPEED CONTROL MTG. BRKT.	B		51										
THERMO COUPLE 6 FT.	A	505324	52	1	1	1	1	1	1				
TEMP. CONT. (JEWELL)	A	505323	53	1	1	1	1	1	1				
TEMP. CONT. (R/S)	A	506002	54	1	1	1	1	1	1				
BUZZER	A	504875	55	1	1	1	1	1	1				
LIMIT SWITCH (U. E.)	A	300016	56	1	1	1	1	1	1				
TOGGLE SWITCH (ON)	A	500283	57	1	1	1	1	1	1				
TOGGLE SWITCH (CONV.)	A	500502	58	1	1	1	1	1	1				
JOG SWITCH	A	505325	59	1	1	1	1	1	1				
PILOT LIGHT	A	503229	60	3	3	3	3	3	3				
FUSE 1 A.	A	501945	61	2	2	2	2	2	2				
FUSE 30 A.	A	501977	62	3	3	3	3	3	3				
FUSE 20 A.	A	502668	63	3	3	3	3	3	3				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-16 SERIES

DWG NO. 203220 THRU 203229

REV D

CN 77-183 REV A
CN 78-13 REV. D

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 220	ASSY 203 221	ASSY 203 222	ASSY 203 223	ASSY 203 224	ASSY 203 225	ASSY	ASSY	ASSY	ASSY
FUSE 3 A.	A	504793	64	2	2	2	2	2	2				
FUSE 3 A.	A	506945	65		1		1		1				
FUSE 3/4 A.	A	500966	66	1		1		1					
HEATER COIL	A	506011	67	3	3	3	3						
HEATER COIL	A	506012	68					3	3				
FUSE 15A.	A	502421	69					3	3				
KNOB (P/H & CONV.)	A	501589	70	2	2	2	2	2	2				
PREHEATER ASSY (220V. 3 EL.)	A	302910	71	1	1	1	1						
PREHEATER ASSY (380V. 3 EL.)	A	302912	72					1	1				
LIP VENT	D	505317	73	1	1	1	1	1	1				
LIP VENT COVER	B	505315	74	1	1	1	1	1	1				
TERM. BLOCK (SPEED CONT.)	A	500071	75	1	1	1	1	1	1				
CONNECTOR - STRAIN RELIEF	A	501782	76	2	2	2	2	2	2				
LOCK NUT	A	502675	77	2	2	2	2	2	2				
BRACKET, MTG AIR VALVE (USED ONLY W/O HOOD)	B	508996	78	1	1	1	1	1	1				
CORD, STRAPPING	A	509146	79	REF.	REF.	REF.	REF.	REF.	REF.				
PANEL, FRONT, SILK SCREENED (C509128)	D	509129	80	1	1	1	1	1	1				
LIGHT, OIL TIGHT ASSY (YEL)	A	303052	81	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (RED)	A	303138	82	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (YEL)	A	303048	83	1	1	1	1	1	1				
BLOCK, CONVEYOR SUPPORT	A	509140	84	2	2	2	2	2	2				
GROMMET, NEOPRENE	A	501653	85	2	2	2	2	2	2				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-16 SERIES

DWG NO. 203220 THRU 203229

REV D

CN77-183 REV A

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 210	ASSY 203 211	ASSY 203 212	ASSY 203 213	ASSY 203 214	ASSY 203 215	ASSY	ASSY	ASSY	ASSY
TDL-10 230V 60HZ 3PH SC		203210		X									
TDL-10 230V 60HZ 3PH FC		203211			X								
TDL-10 230V 50HZ 3PH SC		203212				X							
TDL-10 230V 50HZ 3PH FC		203213					X						
TDL-10 380V 50HZ 3PH SC		203214						X					
TDL-10 380V 50HZ 3PH FC		203215							X				
ARR. DWG. (REF)	B	SK-3573	1										
FOAM FLUXER	A	302909	2	1	1	1	1	1	1				
SUMP	A	300655	3	1	1	1	1	1	1				
PUMP DOM	A	300611	4	1	1								
OIL VALVE	A	300877	5	1	1	1	1	1	1				
MOTOR 60 HZ ASS'Y	A	302780	6	1	1								
SOLDER DRAIN VALVE	A	508111	7	1	1	1	1	1	1				
FRAME (WELDMENT)	C	508720	8	1	1	1	1	1	1				
SCHEMATIC 380 VAC 3/4 HP	D	302906	9					0	0				
SCHEMATIC 230 VAC 3/4 HP	D	302905	10	0	0	0	0						
PUMP FOREIGN	A	300612	11			1	1	1	1				
MOTOR 50 HZ ASS'Y	A	302781	12			1	1	1	1				
SOLDER POT (505311)	C	508725	13	1	1	1	1	1	1				
IMMERSION HEATERS	D	502095	14	3	3	3	3	3	3				
SIDE PLATE-SOL. BASE	B	502187	15	1	1	1	1	1	1				
BRACKET - TERMINAL MTG.	B	502616	16	1	1	1	1	1	1				
GASKET - IMM. HEATER	A	500207	17	3	3	3	3	3	3				
INSULATION	A	502472	18	1	1	1	1	1	1				
KNOB - HINGED WOOD	A	500935	19	1	1	1	1	1	1				
TERMINAL BLOCK	A	501014	20	37	37	37	37	37	37				
END BLOCK	A	500972	21	2	2	2	2	2	2				
RECEPTACLE - MOTOR	A	502037	22	1	1	1	1	1	1				
RECEPTACLE - CONVEYOR	A	505312	23	1	1	1	1	1	1				
TAG, MOTOR ROTATION	A	501998	24	1	1	1	1	1	1				
TAG, CLEANING	C	502998	25	1	1	1	1	1	1				
TAG, LIP VENT INST.	B	504461	26	1	1	1	1	1	1				

C/N 77-3

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL - 10 SERIES

DWG NO. 203210 THRU 203219

REV D

CN77-183 REV A, CN77-297 REV C

SHEET 1 OF 3

20454-1

BUSING

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 210	ASSY 203 211	ASSY 203 212	ASSY 203 213	ASSY 203 214	ASSY 203 215	ASSY	ASSY	ASSY	ASSY
TAG SERIAL NO.	A	500085	27	1	1	1	1	1	1				
STOP SWITCH, 120V N.C.M.C.	A	303041	28	1	1	1	1	1	1				
NAMETAG, EMERGENCY STOP	A	509166	29	1	1	1	1	1	1				
FITTING, SEALTIGHT 3/8 ST	A	500933	30	1	1	1	1	1	1				
LEVELING FEET	A	502531	31	6	6	6	6	6	6				
			32										
BRACKET THERMO COUPLE	A	508297	33	1	1	1	1	1	1				
CLAMP, CAPILLARY	A	500069	34	3	3	3	3	3	3				
			35										
SOL. POT HOOD	D	508731	36	1	1	1	1	1	1				
HINGED HOOD	D	508719	37	1	1	1	1	1	1				
HOOD MTG. ANGLE	B	508744	38	1	1	1	1	1	1				
JUNCTION BOX - (power)	B	507429	39	1	1	1	1	1	1				
JUNCTION BOX - cover	B	507481	40	1	1	1	1	1	1				
CONTROL BOX	D	508728	41	1	1	1	1	1	1				
CONTROL BOX - COVER	B	508736	42	1	1	1	1	1	1				
COMPONENT PANEL - LEFT	C	508722	43	1	1	1	1	1	1				
COMPONENT PANEL - RIGHT	C	508723	44	1	1	1	1	1	1				
TIMER 60 HZ	A	505050	45	1	1								
TIMER 50 HZ	A	505051	46			1	1	1	1				
TRANSFORMER .25 KVA	A	504774	47	1	1	1	1	1	1				
MOTOR STARTER 3P.120V COIL	A	506006	48	1	1	1	1	1	1				
CONTACTOR 3P.120V COIL 30A	A	502403	49	2	2	2	2	2	2				
SPEED CONTROL (STD. & F/C)	A	508716	50	1	1	1	1	1	1				
SPEED CONTROL MTG. BRKT.	B		51										
THERMOCOUPLE 6 FT.	A	505324	52	1	1	1	1	1	1				
TEMP CONTROL (JEWELL)	A	505323	53	1	1	1	1	1	1				
TEMP CONT. (R/S)	A	506002	54	1	1	1	1	1	1				
BUZZER	A	504875	55	1	1	1	1	1	1				
LIMIT SWITCH (U.E.)	A	300016	56	1	1	1	1	1	1				
TOGGLE SWITCH (ON)	A	500283	57	1	1	1	1	1	1				
TOGGLE SWITCH (CONV.)	A	500502	58	1	1	1	1	1	1				
JOG SWITCH	A	505325	59	1	1	1	1	1	1				
PILOT LIGHT	A	503229	60	3	3	3	3	3	3				
FUSE 10 A.	A	502563	61	2	2	2	2						
FUSE 1 A.	A	501945	62	2	2	2	2	2	2				
FUSE 30 A.	A	501977	63	3	3	3	3						
FUSE 20 A.	A	502668	64	1	1	1	1	3	3				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL - 10 SERIES

DWG NO. 203210 THRU 203219

REV. D

CN 77-183 REV A CN 77-297 REV C
CN 77-[illegible] REV B CN 78-13 REV D

20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 210	ASSY 203 211	ASSY 203 212	ASSY 203 213	ASSY 203 214	ASSY 203 215	ASSY	ASSY	ASSY	ASSY
FUSE 3 A.	A	504793	65	2	2	2	2	2	2				
FUSE 3 A.	A	506945	66		1		1		1				
FUSE 3/4 A.	A	500966	67	1		1		1					
HEATER COIL	A	508358	68	3	3								
HEATER COIL	A	506009	69			3	3						
HEATER COIL	A	506016	70					3	3				
FUSE 15 A.	A	502421	71					2	2				
KNOB (P/H & CONV.)	A	501589	72	2	2	2	2	2	2				
PREHEATER ASSY (220V. 2 EL)	A	302911	73	1	1	1	1						
PREHEATER ASSY (380V. 2 EL)	A	302913	74					1	1				
LIP VENT	D	505317	75	1	1	1	1	1	1				
LIP VENT COVER	B	505315	76	1	1	1	1	1	1				
TERM. BLOCK (SPEED CONT.)	A	500071	77	1	1	1	1	1	1				
CONNECTOR-STRAIN RELIEF	A	501782	78	2	2	2	2	2	2				
LOCK NUT	A	502675	79	2	2	2	2	2	2				
BRACKET, MTG AIR VALVE (USED ONLY W/O HOOD)	B	508996	80	1	1	1	1	1	1				
CORD, STRAPPING	A	509146	81	REF.	REF.	REF.	REF.	REF.	REF.				
PANEL, FRONT, SILK SCREENED (C509128)	D	509129	82	1	1	1	1	1	1				
LIGHT, OIL TIGHT ASSY (YEL)	A	303052	83	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (RED)	A	303138	84	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (YEL)	A	303048	85	1	1	1	1	1	1				
BLOCK, CONVEYOR SUPPORT	A	509140	86	2	2	2	2	2	2				
GROMMET, NEOPRENE	A	501653	87	2	2	2	2	2	2				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL - 10 SERIES

DWG NO. 203210 THRU 203219

REV D

CN 77-183 REV A CN 77-297 REV C,

20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 378	ASSY 203 379	ASSY 203 380	ASSY 203 381	ASSY 203 382	ASSY 203 383	ASSY	ASSY	ASSY	ASSY
TDL-12 230V 60HZ 3Ø SC		203378		X									
TDL-12 230V 60HZ 3Ø FC		203379			X								
TDL-12 230V 50HZ 3Ø SC		203380				X							
TDL-12 230V 50HZ 3Ø FC		203381					X						
TDL-12 380V 50HZ 3Ø SC		203382						X					
TDL-12 380V 50HZ 3Ø FC		203383							X				
ARRANGEMENT DRAWING (REF)	B	SK3513	1										
FOAM FLUXER	A	302909	2	1	1	1	1	1	1				
SUMP	A	300643	3	1	1	1	1	1	1				
PUMP DOMESTIC	A	300457	4	1	1								
OIL VALVE	A	300876	5	1	1	1	1	1	1				
MOTOR 60 HZ ASSEMBLY	A	302786	6	1	1								
SOLDER DRAIN VALVE	A	508111	7	1	1	1	1	1	1				
FRAME (WELDMENT)	C	508720	8	1	1	1	1	1	1				
SCHEMATIC 380V 3/4 HP	D	302906	9					0	0				
SCHEMATIC 230V 3/4 HP	D	302905	10	0	0	0	0						
PUMP FOREIGN	A	300469	11			1	1	1	1				
MOTOR 50HZ ASSEMBLY	A	302787	12			1	1	1	1				
SOLDER POT (505311)	C	508725	13	1	1	1	1	1	1				
IMMERSION HEATERS	D	502095	14	3	3	3	3	3	3				
SIDEPLATE - SOLDER BASE	B	502187	15	1	1	1	1	1	1				
			16										
GASKET - IMMERSION HEATER	A	500207	17	3	3	3	3	3	3				
INSULATION	A	502472	18	1	1	1	1	1	1				
KNOB - HINGED HOOD	A	500935	19	1	1	1	1	1	1				
TERMINAL BLOCK	A	501014	20	37	37	37	37	37	37				
END BLOCK	A	500972	21	2	2	2	2	2	2				
RECEPTACLE - MOTOR	A	502037	22	1	1	1	1	1	1				
RECEPTACLE - CONVEYOR	A	505312	23	1	1	1	1	1	1				
TAG, MOTOR ROTATION	A	501998	24	1	1	1	1	1	1				

A C/N 77-3

B C/N 78-1

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-12 SERIES

DWG NO. 203378 THRU 203387

REV B

SHEET 1 OF 3

BRUNING 40-105 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 378	ASSY 203 379	ASSY 203 380	ASSY 203 381	ASSY 203 382	ASSY 203 383	ASSY	ASSY	ASSY	ASSY
TAG, CLEANING	C	502998	25	1	1	1	1	1	1				
TAG, LIP VENT INST.	B	504461	26	1	1	1	1	1	1				
TAG, SERIAL NO.	A	500085	27	1	1	1	1	1	1				
STOP SWITCH, 120V N.C.M.C.	A	303041	28	1	1	1	1	1	1				
NAMETAG, EMERGENCY STOP	A	509166	29	1	1	1	1	1	1				
FITTING, SEALTIGHT 3/8 ST	A	500933	30	1	1	1	1	1	1				
LEVELING FEET	A	502531	31	6	6	6	6	6	6				
			32										
BRACKET, THERMOCOUPLE	A	508297	33	1	1	1	1	1	1				
CLAMP, CAPILLARY	A	500069	34	3	3	3	3	3	3				
			35										
SOLDERING POT HOOD	D	508731	36	1	1	1	1	1	1				
HINGED HOOD	D	508719	37	1	1	1	1	1	1				
HOOD, MTG. ANGLE	B	508744	38	1	1	1	1	1	1				
JUNCTION BOX (POWER)	B	507429	39	1	1	1	1	1	1				
JUNCTION BOX COVER	B	507481	40	1	1	1	1	1	1				
CONTROL BOX	D	508728	41	1	1	1	1	1	1				
			42										
COMPONENT PANEL - LEFT	C	508722	43	1	1	1	1	1	1				
COMPONENT PANEL - RIGHT	C	508723	44	1	1	1	1	1	1				
TIMER, 60 HZ	A	505050	45	1	1								
TIMER, 50 HZ	A	505051	46			1	1	1	1				
TRANSFORMER, 25 KVA	A	504774	47	1	1	1	1	1	1				
MOTOR STARTER 3P, 120V COIL	A	506006	48	1	1	1	1	1	1				
CONTACTOR 3P, 120V COIL 30A	A	502403	49	2	2	2	2	2	2				
SPEED CONTROL (STD. & F/C)	A	508716	50	1	1	1	1	1	1				
SPEED CONTROL MTG. BRKT.	B	~~508717~~	51	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~				
THERMOCOUPLE 6 FT.	A	505324	52	1	1	1	1	1	1				
TEMP CONTROL (JEWELL)	A	505323	53	1	1	1	1	1	1				
TEMP CONT. (R/S)	A	506002	54	1	1	1	1	1	1				
BUZZER	A	504875	55	1	1	1	1	1	1				
LIMIT SWITCH (U.E.) 300016	A	300016	56	1	1	1	1	1	1				
			57										
			58										
JOG SWITCH	A	505325	59	1	1	1	1	1	1				
			60										
FUSE, 10A	A	502563	61	2	2	2	2						
FUSE, 1A	A	501945	62	2	2	2	2	2	2				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY - TDL-12 SERIES

DWG NO. 203378 THRU 203387

REV B

BRUNING 40-105 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 378	ASSY 203 379	ASSY 203 380	ASSY 203 381	ASSY 203 382	ASSY 203 383	ASSY	ASSY	ASSY	ASSY
FUSE, 30A	A	501977	63	3	3	3	3						
FUSE, 20A	A	502688	64	1	1	1	1	3	3				
FUSE, 3A	A	504793	65	2	2	2	2	2	2				
FUSE, 3A	A	506945	66		1		1		1				
FUSE, 3/4A	A	500966	67	1		1		1					
HEATER COIL	A	508358	68	3	3								
HEATER COIL	A	506009	69			3	3						
HEATER COIL	A	506016	70					3	3				
FUSE, 15A	A	502421	71					2	2				
KNOB (P/H & CONV)	A	501589	72	2	2	2	2	2	2				
PREHEATER ASSY (220V 2 EL)	A	302911	73	1	1	1	1						
PREHEATER ASSY (380V 2 EL)	A	302913	74					1	1				
LIP VENT	D	505317	75	1	1	1	1	1	1				
LIP VENT COVER	B	505315	76	1	1	1	1	1	1				
TEAM BLOCK (SPEED CONT.)	A	500071	77	1	1	1	1	1	1				
CONNECTOR - STRAIN RELIEF)	A	501782	78	2	2	2	2	2	2				
LOCK NUT	A	502675	79	2	2	2	2	2	2				
BRACKET, MTG. AIR VALVE (USED ONLY W/O HOOD)	B	508896	80	1	1	1	1	1	1				
			81										
PANEL, FRONT, SILK SCREENED (C509128)	D	509129	82	1	1	1	1	1	1				
LIGHT, OIL TIGHT ASSY (YEL)	A	303052	83	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (RED)	A	303138	84	1	1	1	1	1	1				
SWITCH, PUSH-BUTTON (YEL)	A	303048	85	1	1	1	1	1	1				
BLOCK, CONVEYOR SUPPORT	A	509140	86	2	2	2	2	2	2				
GROMMET, NEOPRENE	A	501653	87	2	2	2	2	2	2				
CORD STRAPPING	A	509146	88	REF.	REF.	REF.	REF.	REF.	REF.				

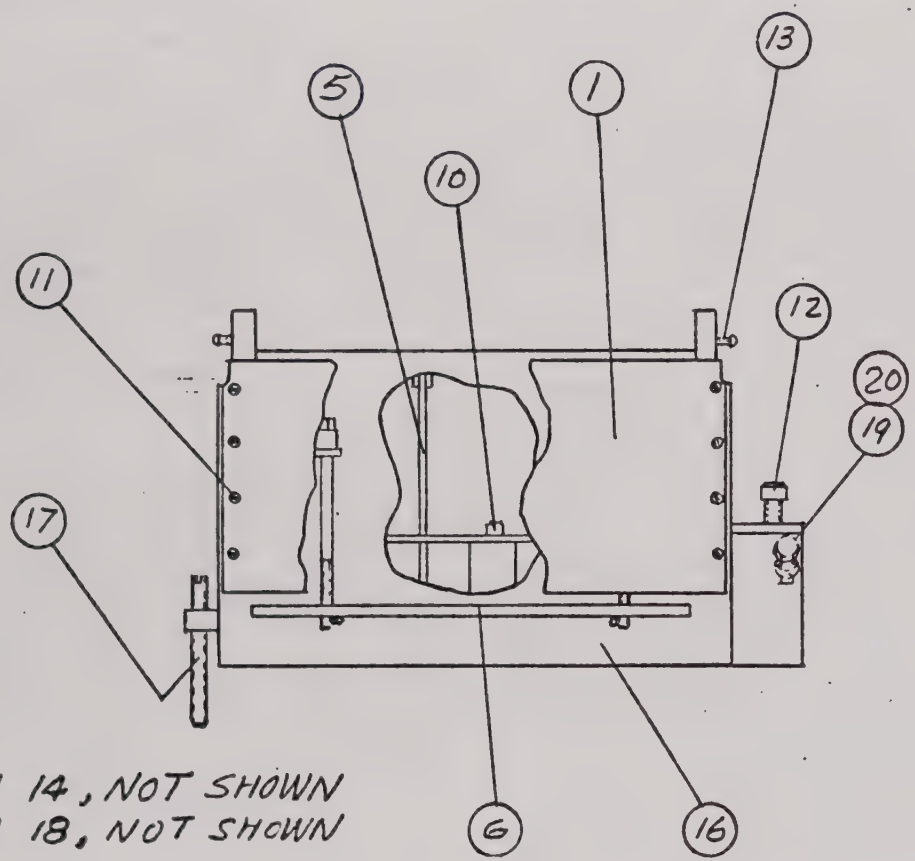
HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

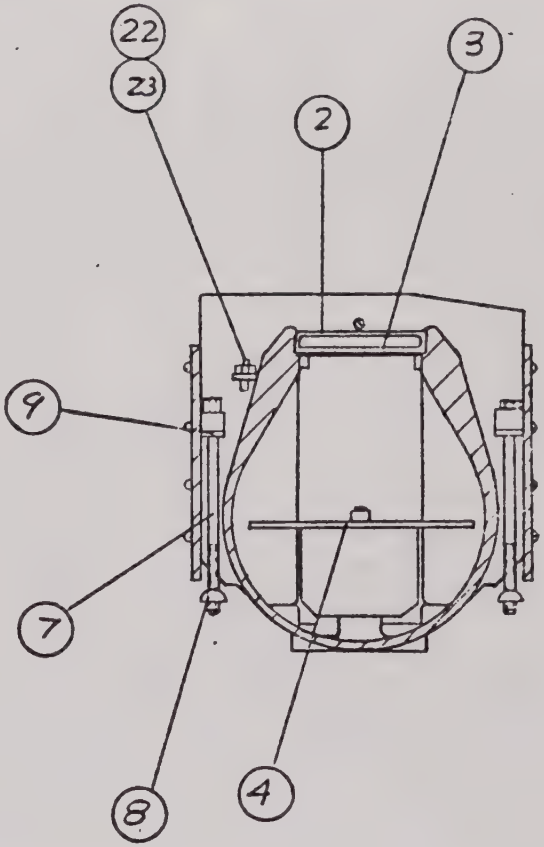
TITLE SOLDER BASE ASSEMBLY, TDL-12 SERIES

DWG NO. 203378 THRU 203387

REV B

BRUNING 40-105 20464-1





ITEM 14, NOT SHOWN
ITEM 18, NOT SHOWN

LTR	DESCRIPTION	DATE BY

REVISIONS

MATERIAL	
HEAT TREAT	
FINAL PROTECTIVE FIN.	
SURFACE FIN. UNLESS OTHERWISE NOTED ✓ ALL OVER	
BREAK SHARP EDGES	
USED ON	NEXT ASSY

DR BY	DATE
CHD BY	DATE
APPD BY	DATE
SCALE	
No. REQD	

UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES

FRACTIONS	DECIMALS .XX	DECIMALS .XXX	ANGLES
± 1/64	±.010	±.005	± 1/2°

ENGINEERING INC.
NASHUA, NEW HAMPSHIRE

TITLE SOLDER SUMP ASSY—DEEP WAVE

SIZE	DWG. No.	REV
A	300655	

SHEET 1 OF 2

DRUNING 40-107 25832-2

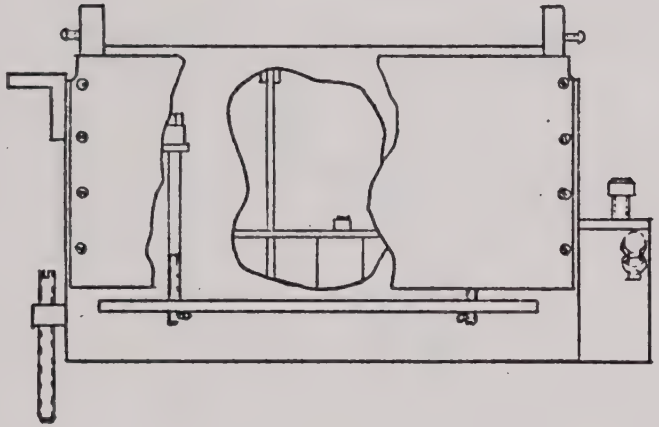
DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 300 655	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
10", TDA		300655		X									
SUMP SIDE PLATE	C	504091	1	2									
TOP HORIZONTAL BAFFLE	B	504100	2	1									
INSIDE HORIZONTAL BAFFLE	B	504101	3	1									
LOWER HORIZONTAL BAFFLE	A	507860	4	1									
VERTICAL BAFFLE	A	504099	5	4									
CHOKE BAR	B	504094	6	2									
ADJUSTING BOLT	A	500605	7	4									
COTTER PIN	A	500606	8	8									
WASHER	A	500954	9	4									
1/4-20 x 1/2 PAN HD. SCR.		S.S.	10	1									
8-32 x 1/4 BINDER HD. SCR.		400007	11	16									
5/16-18 x 1-1/2 SOC HD CAP SCR.		400033	12	1									
8-32 x 3/8 RD. HD. MACH. SCR.		400009	13	2									
SCREW DRIVER W/SOCKET ASSEMBLY	A	505505	14	1									
SCREW DRIVER	A	505141	15	1									
SUMP BODY 10 TDB	D	504080	16	1									
SCREW HEADLESS 3/8-16 x 3 LG.	A	504388	17	1									
1/4 TEE BAR	A	504196	18	1									
1/4-20 x 1¼ LG CAP HEX SOC SCR		BLK OXIDE	19	1									
1/4-20 HEX NUT STEEL			20										
1/4-20 x 3/4 LG CAP HEX SOC SCR		BLK OXIDE	21										
1/4-20 x 1 LG SET SCR		BLK OXIDE	22	1									
1/4-20 HEX NUT		S.S.	23	1									
LADDLE	A	502966	24	1									

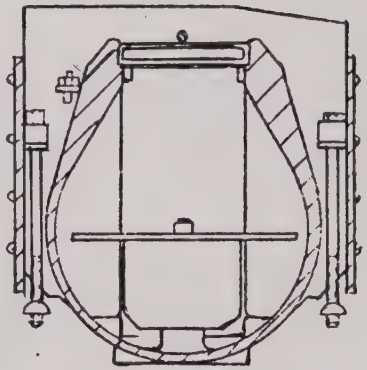
HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER SUMP ASSEMBLY

DWG NO. 300655

REV R





LTR	DESCRIPTION	DATE BY

REVISIONS

MATERIAL	DR BY	DATE
HEAT TREAT	CHD BY	DATE
FINAL PROTECTIVE FIN.	APPD BY	DATE
SURFACE FIN. UNLESS OTHERWISE NOTED ✓ ALL OVER	SCALE	
	No. REQD	
BREAK SHARP EDGES	UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES	
USED ON / NEXT ASSY	FRACTIONS ± 1/4 | DECIMALS .XX ±.010 | .XXX ±.005 | ANGLES ± 1/2°	

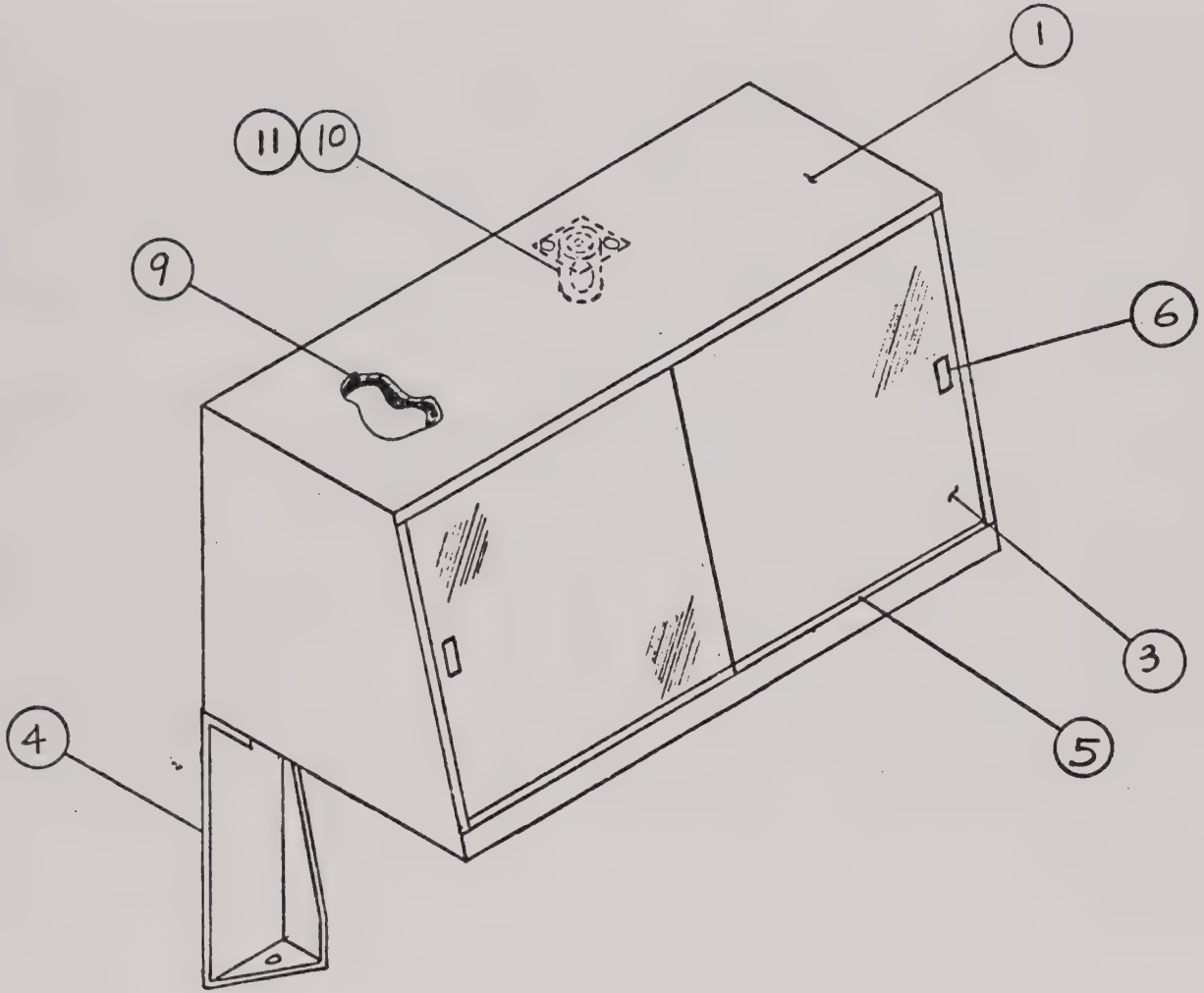
ROLLS ENGINEERING INC.
NASHUA, NEW HAMPSHIRE

TITLE SOLDER SUMP ASSY — DEEP WAVE

SIZE A | DWG. NO. | THRU | REV

SHEET OF

RRUNING 40-107 25/8322



HOLLIS ENG. INC. NASHUA, NEW HAMPSHIRE	TITLE TDL HOOD ASSEMBLY/WITH LIGHT	DWG NO. 280466	REV

SHEET 1 OF 2

BRUNING 40-105 11083

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 280466	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
HOOD ASSEMBLY WITH LIGHT		280466		X								
HOOD 507955	D	598162	1	1								
			2									
WINDOW	A	507977	3	2								
SUPPORT ANGLE - HOOD	B	508199	4	2								
TRACK - BEARING	A	506719	5	1								
HANDLE	A	505378	6	2								
			7									
8-32 x 1/4 LG RD HD MACH SCE			8	3								
INSULATION U/M FT	A	508353	9	10								
LIGHT	A	507205	10	1								
LAMP 75W	A	507756	11	1								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE TDL
HOOD ASSEMBLY/WITH LIGHT

DWG NO. 280466

REV

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 280466	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
HOOD ASSEMBLY WITH LIGHT		280466		X									
HOOD 507955	D	598162	1	1									
			2										
WINDOW	A	507977	3	2									
SUPPORT ANGLE - HOOD	B	508199	4	2									
TRACK - BEARING	A	506719	5	1									
HANDLE	A	505378	6	2									
			7										
8-32 x 1/4 LG RD HD MACH SCE			8	3									
INSULATION U/M FT	A	508353	9	10									
LIGHT	A	507205	10	1									
LAMP 75W	A	507756	11	1									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE TDL
HOOD ASSEMBLY/WITH LIGHT

DWG NO. 280466

REV

SHEET 2 OF 2

BRUNING

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 388	ASSY 203 389	ASSY 203 390	ASSY 203 391	ASSY 203 392	ASSY 203 393	ASSY	ASSY	ASSY	ASSY
TDL-14 230V 60Hz 3PH SC		203388		X									
TDL-14 230V 60Hz 3PH FC		203389			X								
TDL-14 230V 50Hz 3PH SC		203390				X							
TDL-14 230V 50Hz 3PH FC		203391					X						
TDL-14 380V 50Hz 3PH SC		203392						X					
TDL-14 380V 50Hz 3PH FC		203393							X				
ARR. DWG. (REF)	B	SK-3513	1										
FOAM FLUXER	A	302909	2	1	1	1	1	1	1				
SUMP	A	300654	3	1	1	1	1	1	1				
PUMP DOM	A	300457	4	1	1								
OIL VALVE	A	300876	5	1	1	1	1	1	1				
MOTOR 60Hz ASSY	A	302788	6	1	1								
SOLDER DRAIN VALVE	A	508111	7	1	1	1	1	1	1				
FRAME (WELDMENT)	C	508720	8	1	1	1	1	1	1				
SCHEMATIC 380 VAC 3/4 HP	D	303142	9					0	0				
SCHEMATIC 230 VAC 3/4 HP	D	303143	10	0	0	0	0						
PUMP FOREIGN	A	300469	11			1	1	1	1				
MOTOR 50Hz ASSY	A	302789	12			1	1	1	1				
SOLDER POT (505311)	C	508725	13	1	1	1	1	1	1				
IMMERSION HEATERS	D	502095	14	3	3	3	3	3	3				
SIDE PLATE - SOLDER BASE	B	502187	15	1	1	1	1	1	1				
GASKET - IMM. HEATER	A	500207	16	3	3	3	3	3	3				
INSULATION	A	502472	17	1	1	1	1	1	1				
KNOB - HINGED HOOD	A	500935	18	1	1	1	1	1	1				
TERMINAL BLOCK	A	501014	19	37	37	37	37	37	37				
END BLOCK	A	500972	20	2	2	2	2	2	2				
RECEPTACLE - MOTOR	A	502037	21	1	1	1	1	1	1				
RECEPTACLE - CONVEYOR	A	505312	22	1	1	1	1	1	1				
TAG, MOTOR ROTATION	A	501998	23	1	1	1	1	1	1				
TAG, CLEANING	C	502998	24	1	1	1	1	1	1				
TAG, LIP VENT INST	B	504461	25	1	1	1	1	1	1				
TAG, SERIAL NO	A	500085	26	1	1	1	1	1	1				

A C/, 78-

B C^ 78-

BRUNING 40-105 20464-1

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE
SOLDER BASE ASSEMBLY, TDL-14 SERIES

DWG NO.
203388 THRU 203397

REV
B

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203388	ASSY 203389	ASSY 203390	ASSY 203391	ASSY 203392	ASSY 203394	ASSY	ASSY	ASSY	ASSY
STOP SWITCH, 120V NCMC	A	303041	27	1	1	1	1	1	1				
NAMETAG, EMERGENCY STOP	A	509166	28	1	1	1	1	1	1				
FITTING, SEALTIGHT 3/8 ST	A	500933	29	1	1	1	1	1	1				
LEVELING FEET	A	502531	30	6	6	6	6	6	6				
			31										
BRACKET THERMOCOUPLE	A	508297	32	1	1	1	1	1	1				
CLAMP, CAPILLARY	A	500069	33	3	3	3	3	3	3				
			34										
SOL. POT HOOD	D	508731	35	1	1	1	1	1	1				
HINGED HOOD	D	508719	36	1	1	1	1	1	1				
HOOD MTG ANGLE	B	508744	37	1	1	1	1	1	1				
JUNCTION BOX (POWER)	B	507429	38	1	1	1	1	1	1				
JUNCTION BOX - COVER	B	507481	39	1	1	1	1	1	1				
CONTROL BOX	D	508728	40	1	1	1	1	1	1				
COMPONENT PANEL - LEFT	C	508722	41	1	1	1	1	1	1				
COMPONENT PANEL - RIGHT	C	508723	42	1	1	1	1	1	1				
TIMER 60 Hz	A	505050	43	1	1								
TIMER 50 Hz	A	505051	44			1	1	1	1				
TRANSFORMER, .25 KVA	A	504774	45	1	1	1	1	1	1				
MOTOR STARTER 3P 120V COIL	A	506006	46	1	1	1	1	1	1				
CONTACTOR 3P 120V COIL 30A	A	502403	47	2	2	2	2	2	2				
SPEED CONTROL (STD. & F/C)	A	508716	48	1	1	1	1	1	1				
SPEED CONTROL MTG. BRKT.	B	[illegible]	49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
THERMOCOUPLE 6 FT	A	505324	50	1	1	1	1	1	1				
TEMP CONTROL (JEWELL)	A	505323	51	1	1	1	1	1	1				
TEMP CONTROL (R/S)	A	506002	52	1	1	1	1	1	1				
BUZZER	A	504875	53	1	1	1	1	1	1				
LIMIT SWITCH (U.E.)	A	300016	54	1	1	1	1	1	1				
JOG SWITCH	A	505325	55	1	1	1	1	1	1				
FUSE 10 A	A	502563	56	2	2	2	2						
FUSE 1 A	A	501945	57	2	2	2	2	2	2				
FUSE 30 A	A	501977	58	3	3	3	3						
FUSE 20 A	A	502668	59	1	1	1	1	3	3				
FUSE 3 A	A	504793	60	2	2	2	2	2	2				
FUSE 3 A	A	506945	61		1		1		1				
FUSE 3/4 A	A	500966	62	1		1		1					
HEATER COIL	A	508358	63	3	3								
HEATER COIL	A	506009	64			3	3						

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-14 SERIES

DWG NO. 203388 THRU 203397

REV B

BRUNING 40-105 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 388	ASSY 203 389	ASSY 203 390	ASSY 203 391	ASSY 203 392	ASSY 203 393	ASSY	ASSY	ASSY	ASSY
HEATER COIL	A	506016	65					3	3				
FUSE 15 A	A	502421	66					2	2				
KNOB (P/H & CONV)	A	501589	67	2	2	2	2	2	2				
PREHEATER ASSY (220V 3 EL)	A	302910	68	1	1	1	1						
PREHEATER ASSY (380V, 3 EL)	A	302912	69					1	1				
LIP VENT	D	505317	70	1	1	1	1	1	1				
LIP VENT COVER	B	505315	71	1	1	1	1	1	1				
TEAM BLOCK (SPEED CONT.)	A	500071	72	1	1	1	1	1	1				
CONNECTOR - STRAIN RELIEF	A	501782	73	2	2	2	2	2	2				
LOCK NUT	A	502675	74	2	2	2	2	2	2				
BRACKET, MTG AIR VALVE (USED ONLY W/O HOOD	B	508996	75	1	1	1	1	1	1				
PANEL, FRONT, SILK SCREENED (C509128)	D	509129	76	1	1	1	1	1	1				
LIGHT, OIL TIGHT ASSY (YEL)	A	303052	77	1	1	1	1	1	1				
SWITCH, PUSHBUTTON (RED)	A	303138	78	1	1	1	1	1	1				
SWITCH, PUSHBUTTON (YEL)	A	303048	79	1	1	1	1	1	1				
BLOCK, CONVEYOR SUPPORT	A	509140	80	2	2	2	2	2	2				
GROMMET, NEOPRENE	A	501563	81	2	2	2	2	2	2				
CORD, STRAPPING	A	509146	82	REF	REF	REF	REF	REF	REF				

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: SOLDER BASE ASSEMBLY, TDL-14 SERIES

DWG NO. 203388 THRU 203397

REV B

BRUNING 40-105 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 302 421	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
10" OIL VALVE	A	302421		X									
SELECTOR ASSEMBLY	A	507523	1	1									
SCREEN ASSEMBLY	A	507522	2	1									
HANDLE	A	507512	3	1									
CLAMP	A	502732	4	1									
POINTER	A	501104	5	1									
PLATE - HOLDING	A	500245	6	1									
			7										
			8										
TUBE, 10"	A	507516	9	1									
			10										
			11										
BODY	B	507509	12	1									
6-32 UNC x ¼ LG PHMS S.S.			13	1									
4-40 UNC x ¼ LG PHMS S.S.			14	2									
4-40 UNC x ¼ LG FHMS S.S.			15	3									
6-32 UNC x ¼ LG FHMS S.S.			16	1									
8-32 UNC x ¼ LG PHMS S.S.			17	1									
5/16-18 UNC HEX NUT S.S.			18	1									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FIVE-POSITION OIL VALVE ASSEMBLY WITH SCREEN

DWG NO. 302421

REV B

BRUNING 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 202 981	ASSY 202 982	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
10", 1½ SPACING		202981		X									
10", 3/4 SPACING		202982			X								
RAIL - FIXED	D	505338	1	1	1								
RAIL - ADJUSTABLE	D	505340	2	1	1								
LEAD SCREW COVER	B	505335	3	1	1								
THRUST WASHER	A	504366	4	8	8								
BEARING BLOCK	A	501718	5	4	4								
OILITE BEARING	A	501763	6	5	5								
OILITE THRUST BEARING	A	502481	7	4	4								
LEAD SCREW	B	501779	8	1	1								
NUT	B	501711	9	2	2								
ROLL PIN 3/32 DIA. x 3/4 LONG	A	501822	10	4	4								
CHAIN - 1/4 PITCH (U/M FT)	A	500163	11	21	21								
LINK	A	500160	12	1	1								
OILITE THRUST BUSHING	A	502475	13	2	2								
SPROCKET	A	501809	14	4	4								
HANDWHEEL	A	501781	15	1	1								
HANDLE FOR HANDWHEEL	A	501786	16	1	1								
FINGER GUIDE - MIDDLE	B	505336	17	1	1								
CROSS TIE ANGLE	B	505337	18	1	1								
CROSS TIE ANGLE	B	501700	19	1	1								
FINGER GUIDE - LEFT	B	506454	20	1	1								
CROSS TIE	C	501919	21	2	2								
PIVOT PIN	A	507425	22	4	4								
KNOB	A	502433	23	4	4								
RETAINING RING	A	501808	24	4	4								
THRUST WASHER 3/8 x 5/8 x 1/8	A	501741	25	4	4								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDA 10"

DWG NO. 202981 thru 202982 REV A

SHEET 1 OF 4

BRUENING 204-4-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 202981	ASSY 202982	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
SPYRALIGN PRESS-BEARING	A	502356	26	4	4								
TENSION PLATE	A	501704	27	2	2								
NEEDLE THRUST BEARING	A	504367	28	4	4								
SPROCKET ASSEMBLY	A	508104	29	2	2								
TENSION PLATE	A	501705	30	2	2								
STOP PLATE	A	502711	31	1	1								
LEAD SCREW	B	501778	32	1	1								
CROSS TIE ANGLE	B	501699	33	1	1								
CROSS TIE ANGLE	B	501721	34	1	1								
FINGER GUIDE RIGHT	B	506453	35	1	1								
HEIGHT ADJUSTMENT (LONG)	B	500339	36	2	2								
CHAIN GUARD - ADJ. RAIL	B	505339	37	1	1								
TENSION ARM COVER	B	504281	38	2	2								
ANGLE BRACKET	A	501849	39	5	5								
RIVET	A	502812	40	320	640								
CONVEYOR MOUNTING BRACKET	C	502737	41	1	1								
CHAIN (U/M FT)	A	504641	42	37	37								
LINK, MASTER	A	504870	43	2	2								
SHOULDER SCREW	A	504276	44	2	2								
IDLER SPROCKET	A	504275	45	2	2								
ANTI-DRIP BLOCK	A	502647	46	2	2								
ANTI-DRIP BLOCK	A	502648	47	2	2								
BEARING	A	504015	48	1	1								
TENSION ARM	A	504188	49	2	2								
ROLL PIN	A	503105	50	1	1								
LOCKING BLOCK	A	504591	51	4	4								
DOUBLE FINGER ASSEMBLY	A	302170	52	160	320								
BEARING 3/8 ID x 1/2 OD x 1/2 LG	A	501764	53	4	4								
LEAD SCREW COVER	B	501730	54	1	1								
CHAIN DRIVE MECH. ASSEMBLY	A	301326	55	1	1								
SPACER, CONV. MTG. BRACKET	B	505394	56	1	1								
LEAD SCREW	B	504573	57	1	1								
BEARING BLOCK	A	501846	58	1	1								
NUT	A	501845	59	1	1								
CHAIN GUARD	B	505410	60	1	1								
CHAIN GUIDE - LEFT	B	506456	61	1	1								
CHAIN GUIDE - RIGHT	B	506455	62	1	1								
CHAIN GUIDE - LEFT (R)	B	504611	63	1	1								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDA 10"

DWG NO. 202981 thru 202982 REV A

BRUNING 20-5341

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 202 981	ASSY 202 982	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
CHAIN GUIDE — RIGHT - (R)	B	504649	64	1	1								
F.C. MANUAL LOADING ASSEMBLY	A	202217	65	1	1								
HEIGHT ADJUSTMENT (SHORT)	A	508270	66	2	2								
STOP PLATE	A	502712	67	1	1								
EXTENSION FOR F.C. HANDWHEEL	A	505748	68	1	1								
			69										
			71										
			72										
			73										
			74										
			75										
			76										
6-32 x 3/4 FLAT SOC HD CAP SCR		BLK OXIDE	78	2	2								
8-32 x 3/4 LG SOC HD SCR			79	8	8								
10-32 x 1/4 LG SET SCREW		CUP POINT	80	2	2								
10-32 x 1/4 LG BUT HD CAP SCR		BLK OXIDE	81	30	30								
10-32 x 3/8 BUT HD CAP SCR		BLK OXIDE	82	9	9								
10-32 x 1/2" LG SOC HD CAP SCR		BLK OXIDE	83	8	8								
10-32 x 3/4 LG SOC HD CAP SCR		BLK OXIDE	84	2	2								
10-32 x 1" BUT HD CAP SCR		BLK OXIDE	85	8	8								
10-32 x 2 SOC HD CAP SCR		BLK OXIDE	86	4	4								
#10 FLAT WASHER		ZINK PLT.	87	12	12								
1/4-20 x 5/8 LG SOC HD SCR		BLK OXIDE	88	12	12								
1/4-20 x 2 SOC HD CAP SCR		BLK OXIDE	89	-	-								
1/4-20 x 2" LG SET SCR			90	4	4								
1/4 SPLIT LOCK WASHER		ZINC PLT.	91	12	12								
1/4-20 LOC NUT			92	4	4								
1/2-13 x 1-1/2 HEX HD CAP SCR		CAP. PLT.	93	4	4								
1/2 WASHER		LAD. PLT.	94	8	8								

20464-1

BRUNING

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDA 10"

DWG NO: 202981 thru 202982

REV:

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 301 326	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
C.D.M. TDA-14 BODINE RC		301326		X									
MOTOR MOUNTING BOX	C	505343	1	1									
MOTOR BOX COVER	C	505344	2	1									
SUPPORT CHANNEL	C	504628	3	1									
			4										
			5										
			6										
END PLATE	B	504533	7	1									
END PLATE	B	504534	8	1									
SLIDE PLATE	A	504535	9	1									
MOTOR - BODINE	A	504619	10	1									
			11										
SPACER 3/32 THICK	A	504549	12	4									
FLEXIBLE COUPLING	A	504651	13	1									
BUSHING	A	504545	14	4									
FLANGE BUSHING	A	504546	15	2									
SPROCKET - 1/2 BORE	A	504643	16	1									
SPROCKET	A	504548	17	4									
IDLER PIN	A	504647	18	2									
IDLER PIN	A	504648	19	2									
HEYMAN CONN.	A	503058	20	1									
CAM FOLLOWER	A	504575	21	1									
CAM FOLLOWER BLOCK	A	504576	22	1									
SUPPORT BRACKET	A	504626	23	1									
SPACER 3/32 THICK	A	504644	24	1									
RETAINING RING	A	501484	25	6									
FRONT PLATE	A	504639	26	1									
BUSHING	A	501764	27	1									
SPROCKET ASSEMBLY	A	508105	28	1									
SPROCKET ASSEMBLY	A	508106	29	1									
CHAIN #25 (U/M FT.)	A	500163	30	5									
CHAIN LINK	A	500160	31	1									
			32										
8-32 x 1" LG. B.H.C.S.			33	2									
8-32 x 1/4 LG. P.H.M.S.			34	3									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: CHAIN DRIVE MECHANISM FOR READ-OUT AND REMOTE CONTROL

DWG NO. 301326

REV

BRUNING 20-FA1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 301326	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
10-32 x 1/4 LG. B.H.C.S.			35	10									
10-32 x 3/8 LG. B.H.C.S.			36	6									
10-32 x 1" LG. F.H.C.S.			37	6									
1/4-20 x 5/8 LG. S.H.C.S.			38	2									
1/4-20 x 3/4 LG. S.H.C.S.			39	4									
1/4-20 x 1" LG. F.H.C.S.			40	2									
1/4 FLAT WASHER			41	2									
1/4 LOCK WASHER			42	4									
			43										
			44										
			45										
			46										
			47										
			48										
L.H. SUPPORT ANGLE	B	504632	49	1									
R.H. SUPPORT ANGLE	B	504633	50	1									
PLUG	A	505348	51	1									
COVER, CHAIN DRIVE	C	504631	52	1									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: CHAIN DRIVE MECHANISM FOR READ-OUT AND REMOTE CONTROL

DWG NO. 301326

REV

SHEET 3 OF 3

BRUNING 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 380 502	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
REMOTE CONTROL - 10" 220, 60HZ	C	380502		X									
CONTROL BOX 507966	A	507965	1	1									
SILK SCREEN 508260	C	508261	2	1									
SWITCH - POWER	A	508208	3	1									
SWITCH - CONVEYOR	A	508254	4	1									
SWITCH - PUMP	A	505325	5	1									
CONTROL - PREHEATER ROBERT SHAW	A	507978	6	1									
CONTROL - HEATER JEWELL INST.	A	507979	7	1									
LIGHT - AMBER	A	508250	8	2									
SWITCH, PREHEATER	A	508275	9	1									
KNOB	A	501040	10	1									
LIMIT SWITCH 15 FT CAP	A	300193	11	1									
U.E. BRACKE	A	501206	12	1									
ENCLOSURE 508295	A	508299	13	1									
INSIDE PANEL	A	508296	14	1									
			15										
CONTACTOR - 30 A	A	508251	16	4									
TRANSFORMER - .5 KVA	A	507497	17	1									
TIMER 220V, 60HZ	A	505050	18	1									
THERMOCOUPLE - 6'	A	505324	19	1									
MOTOR STARTER	A	508257	20	1									
HEATER COIL	A	506009	21	3									
BUZZER	A	508258	23	1									
FUSE - 60A	A	507992	24	3									
FUSE - 30A	A	501977	25	3									
FUSE - 20A	A	502668	26	1									
FUSE - 8A	A	504773	27	1									
FUSE - 10A	A	502563	28	2									
FUSE - 1A	A	501945	29	2									
TERMINAL STRIP	A	501014	30	25									
END CAP	A	500972	31	2									
FUSE BLOCK	A	501946	32	18									
END CAP	B	501947	33	2									
			34										

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: REMOTE CONTROL ASSY
USED WITH FINGER CONV 24V CONTROL CIR
HOOD W/LT.

DWG NO. 380502

REV A

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 380 502	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
			35									
			36									
			37									
			38									
SPEED CONTROL F.C.	A	504622	39	1								
DISCONNECT SWITCH 600V, 3 POLE	A	508148	40	1								
			41									
			42									
FLOOR STAND KIT	A	508201	43	2								
HANDLE, DOOR	A	508182	44	1								
			45									
DOOR INTERLOCK SAFETY SW.	A	503192	46	1								
TRANS 120/240P - 24S	A	508253	47	1								
SWITCH EMERG STOP	A	507846	48	1								
"O" RING 3/8 ID x 9/16 OD x 3/32 WALL	A	508252	49	1								
NAMETAG, EMERGENCY STOP	A	508166	50	1								
			51									
TERMINAL, BLOCK 3 POS.	A	502538	52	1								
STRAIN RELIEF BUSHING	A	501782	53	1								
GASKET 1/4THK x 3/8WIDE, U/M FT	A	508354	54	4								
CONTACTOR 3 POLE 120V, COIL	A	502403	55	1								
CONTROL P.H.	A	506002	56	1								
"O" RING, 3/8 ID	A	508252	57	1								
NAME TAG "PREHEATER"	A	508355	58	1								
FUSE 1/2 AMP, 250 VAC	A	508264	59	2								
FUSE 2 AMP	A	502383	60	2								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE REMOTE CONTROL ASSY
USED WITH FINGER CONV 24V CONTROL CIR
HOOD W/LT.

DWG NO. 380502

REV A

SHEET 3 OF 3

20464-1

BRUNING

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 280467	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
TDL-10 230V 60 HZ 3PH FC 24VCC		280467		X									
HOOD WITH LITHT													
FOAM FLUXER	A	201221	1	1									
PREHEATER ASSY 220V 1PH 2EL	A	202939	2	1									
SUMP	A	300655	3	1									
PUMP DOM	A	300611	4	1									
OIL VALVE	A	302421	5	1									
MOTOR 60 HZ	A	302780	6	1									
SOLDER DRAIN VALVE	A	508111	7	1									
FRAME (WELDMENT)	C	508203	8	1									
SCHEMATIC 250 VAC 60-50 HZ	D	380501	9	0									
REMOTE 230V 60 HZ FC	A	380502	10	1									
SOLDER POT 505311	C	508137	11	1									
IMMERSION HEATERS	D	502095	12	3									
SIDE PLATE CONV.	B	508196	13	1									
SIDE PLATE-HOOD,PH,MTG. 508196	B	598163	14	1									
SIDE PLATE, COVER	B	502187	15	1									
COVER-EXHAUST GUARD	D	508195	16	1									
COVER-EXHAUST HOOD	D	508194	17	1									
BRACKET - TERMINAL MTG.	B	502616	18	1									
GASKET - IMM. HEATER	A	500207	19	3									
INSULATION	A	502472	20	1									
KNOB - EXHAUST HOOD	A	500935	21	1									
TERMINAL BLOCK	A	501014	22	37									
END BLOCK	A	500972	23	2									
			24	-									
			25										
PANEL, FRONT	C	507960	26	1									
TAG MOTOR ROTATION	A	501998	27	1									
TAG, CLEANING	B	502998	28	1									
TAG, LIP VENT INST.	B	504461	29	1									
TAG, SERIAL NO.	A	500085	30	1									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE HOOD W/LT. SOLDER BASE ASSY, JIC 24 VOLT CONTROL CIR. — TDL-10 SERIES

DWG NO. 280467 — REV

DRAWING 280467-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 280467	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
COVER PLATE	B	508300	31									
BOX SWITCH 506183	B	508204	32	1								
COVER SWITCH BOX	A	506187	33	1								
SEALTIGHT	A	500079	34	12								
FITTING SEALTIGHT 3/8 90°	A	500053	35	4								
FITTING SEALTIGHT 3/8 STR	A	500933	36	4								
FITTING SEALTIGHT 1-1/4" ST	A	507162	37	2								
1 NPT LOCK NUT	A	508209	38	1								
SEALTIGHT 1-1/4" (U/M FT)	A	507225	39	12								
LEVELING FEET	A	502531	40	6								
SEALTITE 3/4" (U/M FT)	A	501787	41	1								
FITTING, SEALTIGHT 3/4" 90°	A	501788	42	2								
LOCKNUT 1-1/4 NPT (507162)	A	508298	43	1								
BRACKET TERM MFG	B	504439	44	1								
BRACKET THERMO-COUPLE	A	508297	45	1								
CLAMP CAPILLARY	A	500069	46	3								
STRAIN RELIEF BUSHING	A	501782	47	1								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

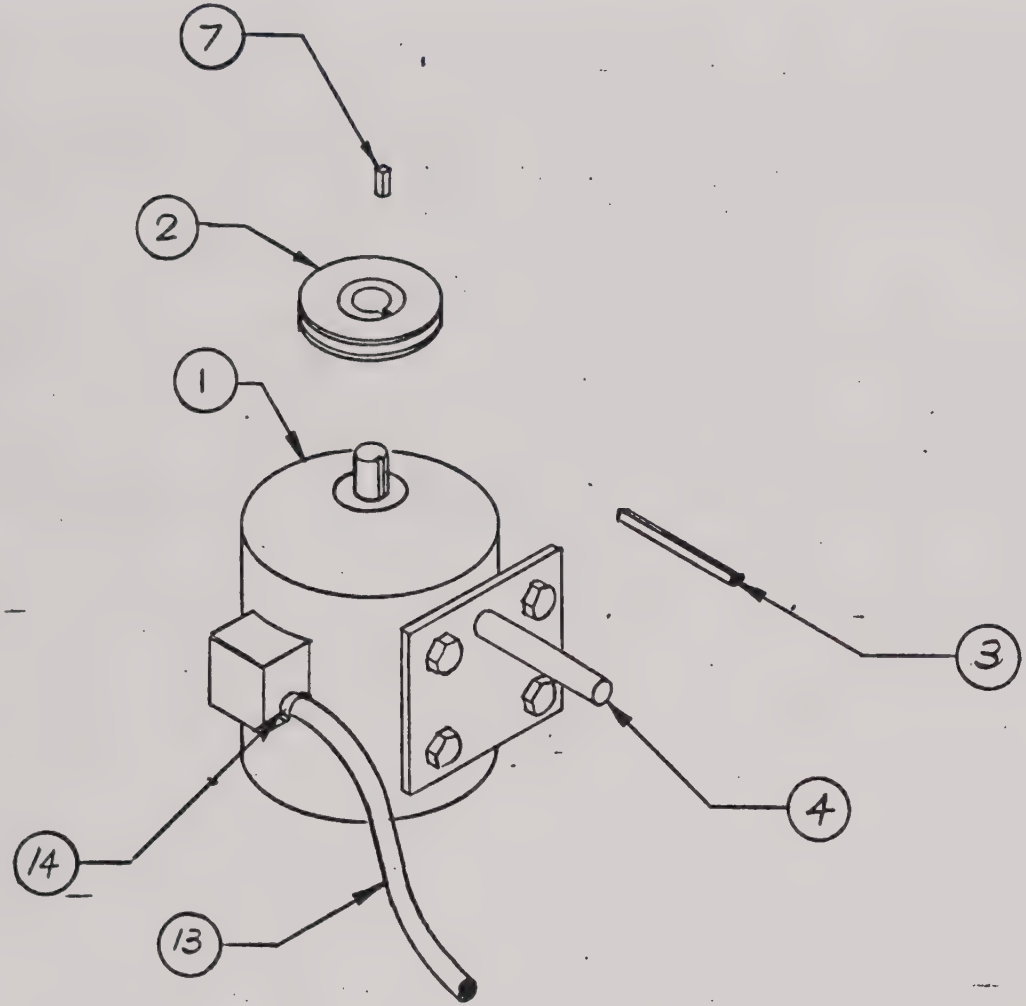
TITLE HOOD W/LT.
SOLDER BASE ASSEMBLY, JIC
24 VOLT CONTROL CIR

TDL-10 SERIES

DWG NO. 280467

REV

BRUNING 20.164-1



HOLLIS ENG. INC. NASHUA, NEW HAMPSHIRE	TITLE MOTOR & MOUNT ASSY	DWG N2 302780	REV

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 302 780	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
TDL-10 60 HZ, 220V.JIC		302780											
MTR 3/4 HP,230/460/380V, 50/60	A	505057	1	1									
PULLEY SINGLE 3½ O.D.51813 HZ3PH	A	500352	2	1									
V-BELTS 41" LG	A	502722	3	1									
MOTOR MTG PLATE	B	500084	4	1									
			5										
			6										
KEY 3/16 x 3/16 x 1½ LG	A	500081	7	1									
5/16-18 x 1 HEX HD BOLT			8	4									
5/16 LOCK WASHER			9	4									
5/16 FLAT WASHER			10	4									
			11										
			12										
SEALTIGHT 3/8" (U/M FT)	A	500079	13	4									
FITTING SEALTIGHT 3/8 ST.90	A	500053	14	1									

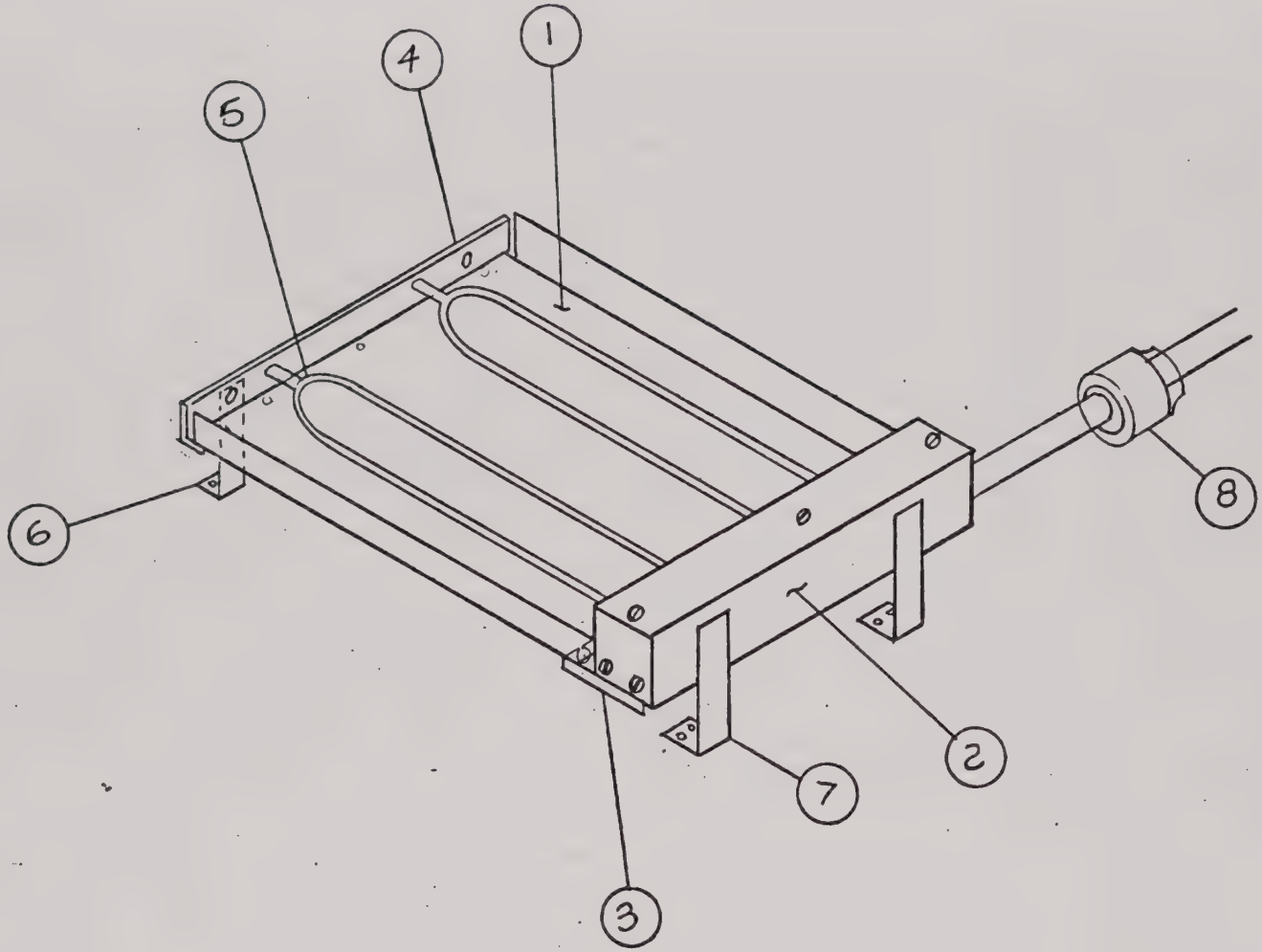
HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: MOTOR & MOUNT ASSY

DWG NO. 302780

REV

TRUNING 20464-1



HOLLIS ENG. INC. NASHUA, NEW HAMPSHIRE	TITLE PREHEATER ASSEMBLY - TDL	DWG NO. 202939	REV

SHEET 1 OF 2

BRUNING 40 105 11083

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 202939	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
P.H. ASSY 220VAC 1PH (2)EL		202939		X								
REFLECTOR (LONG)	C	505331	1	1								
CASE	B	506606	2	1								
COVER	B	505329	3	1								
SUPPORT	B	506605	4	1								
ELEMENT (LONG) 230 VAC	B	506604	5	2								
SUPPORT BRACKET	A	507963	6	2								
SUPPORT BRACKET	A	507964	7	2								
PLUG - 220V	A	505163	8	1								
			9									
			10									
			11									
			12									
FITTING SEALTIGHT, 3/8 ST.	A	500053	13	1								
SEALTIGHT, 3/8" (U/M FT)	A	500079	14	5								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: PREHEATER ASSEMBLY - TDL

DWG NO. 202939

REV

SHEET 2 OF 2

DPUNING 204641

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203230	ASSY 203231	ASSY 203232	ASSY 203233	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
CONVEYOR ASSEMBLY - 10"		203230		X									
CONVEYOR ASSEMBLY - 16"		203231			X								
CONVEYOR ASSEMBLY - 12"		203232				X							
CONVEYOR ASSEMBLY - 14"		203233					X						
RAIL - DRIVE 502235	D	505385	1	1	1	1	1						
RAIL - IDLE 502704	D	505386	2	1	1	1	1						
SPACER, CONVEYOR MTG. BRKT.	B	505388	3	1	1	1	1						
MOTOR MTG. PLATE	B	505389	4	1	1	1	1						
			5										
MOTOR	A	505501	6	1	1	1	1						
BEARING FLG'D, OILITE	A	505387	7	1	1	1	1						
SPACER, CROSS TIE	A	505305	8	4	4	4	4						
			9										
CROSS TIE, 10" (504616)	C	504617	10	2									
CROSS TIE, 12" (506925)	C	502129	11			2							
CROSS TIE, 14" (506926)	C	502130	12				2						
CROSS TIE, 16" (503117)	C	503118	13		2								
CONV. MTG. BRKT. (504681) 10"	C	504682	14	1		1	1						
			15										
SPACER - HEIGHT ADJ.	A	508747	16	8	8	8	8						
CONV. MTG. BRKT., 16" 501916	C	502737	17		1								
HEIGHT ADJUSTMENT, EXTRA SHORT	A	508748	18	2	2	2	2						
HEIGHT ADJUSTMENT, 6 1/2" LG.	A	508746	19	2	2	2	2						
KNOB	A	502433	20	4	4	4	4						
SPROCKET	A	500158	21	1	1	1	1						
SPROCKET, DRIVE	A	501809	22	1	1	1	1						
DRIP CLIP	A	501166	23	2	2	2	2						
PIN, PIVOT	A	507425	24	4	4	4	4						
MASTER LINK, 1/4 PITCH	A	500160	25	1	1	1	1						
CHAIN, 1/4 PITCH (U/M FT.)	A	500163	26	15	15	15	15						

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: STANDARD CONVEYOR ASS'Y TDL

DWG NO. 203230 THRU 203239

REV A

SHEET 1 OF 2

BRUNING 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 230	ASSY 203 231	ASSY 203 232	ASSY 203 233	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CIN: 77121
CHAIN, TENSION PLATE ASSEMBLY	A	507924	27	1	1	1	1						
BUSHING	A	505877	28	1	1	1	1						
THRUST WASHER	A	504366	29	4	4	4	4						
NEEDLE THRUST WASHER	A	504367	30	2	2	2	2						
			31										
6-32 x 3/8 FLAT HD SCR S.S.			32	2	2	2	2						
10-24 x 3/8 PAN HD SCR S.S.			33	3	3	3	3						
10-32 x 3/4 SOC HD CAP SCR			34	4	4	4	4						
1/4-20 x 1/2 HEX HD BOLT CAD PLATED			35	1	1	1	1						
1/4-20 x 1-1/2 FLAT HD SCR			36	2	2	2	2						
5/16-18 x 2-1/4 HEX HD BOLT CAD PLATED			37	8	8	8	8						
1/2-20 x 2 HEX HD BOLT CAD PLATED			38	2	2	2	2						
			39										
			40										
#10 FLAT WASHER, S.S.			41	3	3	3	3						
#1/4 FLAT WASHER, CAD PLATED			42	1	1	1	1						
#5/16 FLAT WASHER, CAD PLATED			43	8	8	8	8						
#1/2 FLAT WASHER, CAD PLATED			44	2	2	2	2						
JUNCTION BOX	A	508897	45	1	1	1	1						
COVER FOR JUNCTION BOX	A	500267	46	1	1	1	1						
CONNECTOR, STRAIN RELIEF	A	501782	47	1	1	1	1						
CONNECTOR, OIL TIGHT 3/8"	A	500933	48	1	1	1	1						
TERMINAL STRIP	A	506396	49	1	1	1	1						

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: STANDARD CONVEYOR ASS'Y TDL

DWG NO. 203230 THRU 203239

REV A

BRUNING 20464-1

1976

	DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 250	ASSY 203 251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CN NO.
	16", 1½ SPACING		203250		X									77-286 A
	16", 3/4 SPACING		203251			X								
	LEAD SCW. LAYOUT	D	L-239		REF	REF								
	RAIL - FIXED	D	505338	1	1	1								
	RAIL - ADJUSTABLE	D	505340	2	1	1								
	LEAD SCREW COVER, LEFT	B	508740	3	1	1								
	STOP PLATE	A	502712	4	1	1								
	BEARING BLOCK	B	501718	5	4	4								
	OILITE BEARING	A	501763	6	5	5								
	OILITE THRUST BUSHING	A	502481	7	4	4								
A	LEAD SCREW, DRIVE END (A502564)	B	508734	8	1	1								
	NUT	B	501711	9	2	2								
	ROLL PIN 3/32 DIA. x 3/4 LG.	A	501822	10	4	4								
	CHAIN	A	500163	11	21	21								
	LINK	A	500160	12	2	2								
	OILITE THRUST BUSHING	A	502475	13	2	2								
	SPROCKET	A	501809	14	4	4								
A	HAND WHEEL, MODIFIED (A501785)	A	501781	15	1	1								
	HANDLE (FOR HAND WHEEL)	A	501786	16	1	1								
	FINGER GUIDE - MIDDLE	B	505336	17	1	1								
	CROSS TIE ANGLE	B	505411	18	1	1								
	CROSS TIE ANGLE	B	505412	19	1	1								
	FINGER GUIDE - LEFT	B	506454	20	1	1								
	CROSS TIE	C	504655	21	2	2								
	PIVOT PIN	A	507425	22	4	4								
	KNOB	A	502433	23	4	4								
	RETAINING RING	A	501808	24	4	4								
	THRUST WASHER 3/8 x 5/8 x 1/8	A	501741	25	4	4								
	SPYRALIGN PRESS BEARING	A	502356	26	4	4								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDL 16"

DWG. NO. 203250 THRU 203259

REV A

1976

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203 250	ASSY 203 251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CN NO.
TENSION PLATE	A	501704	27	2	2								77-286 A
RIVET (NOT SHOWN)	A	502507	28	2	2								
10-32 x 1/4 LG. SET SCREW		CUP POINT	29	2	2								
SPROCKET ASSEMBLY	A	508104	30	2	2								
TENSION PLATE	A	501705	31	2	2								
STOP PLATE	A	502711	32	1	1								
LEAD SCREW COVER	B	504667	33	1	1								
LEAD SCREW, IDLE END (A502564)	B	504664	34	1	1								
CROSS TIE ANGLE	B	504662	35	1	1								
CROSS TIE ANGLE	B	504660	36	1	1								
FINGER GUIDE - RIGHT	B	506453	37	1	1								
MTG. BRKT. - SPACER	B	505394	38	1	1								
HEIGHT ADJUSTMENT 10 1/2"	A	508749	39	2	2								
CHAIN GUARD	B	505339	40	1	1								
TENSION ARM COVER	B	504281	41	2	2								
ANGLE BRACKET	A	501849	42	5	5								
RIVET	A	502812	43	640	1280								
CONVEYOR CLIP ASSEMBLY	A	507479	44	320	640								
CONVEYOR MOUNTING BRACKET	C	502737	45	1	1								
CHAIN (U/M-FT)	A	504641	46	37	37								
LINK, MASTER	A	504870	47	2	2								
CHAIN DRIVE MECHANISM	C	301329	48	1	1								
OILITE BEARING	A	501764	49	4	4								
SHOULDER SCREW	A	504276	50	2	2								
IDLER SPROCKET	A	504275	51	2	2								
NUT	A	501845	52	1	1								
LEAD SCREW (A502564)	B	504666	53	1	1								
BEARING BLOCK	A	501846	54	1	1								
COLLAR	A	502035	55	1	1								
CHAIN GUARD - ADJ. RAIL	B	505410	56	1	1								
ANTI-DRIP BLOCK	A	502647	57	2	2								
ANTI-DRIP BLOCK	A	502648	58	2	2								
BEARING	A	504015	59	2	2								
THRUST WASHER	A	501742	60	1	1								
THRUST WASHER	A	504366	61	8	8								
NEEDLE THRUST WASHER	A	504367	62	4	4								
TENSION ARM	A	504188	63	2	2								
ROLL PIN	A	503105	64	1	1								

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: FINGER CONVEYOR - TDL 16"

DWG NO. 203250 THRU 203259

REV A

204541 PRINTING

1976

	DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 203250	ASSY 203251	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY CN NO.
	F.C. MANUAL LOADING ASSEMBLY	A	202218	65	1	1								77-286 A
	LOCKING BLOCK		504591	66	4	4								
	CHAIN GUIDE LEFT, REAR	B	504611	67	1	1								
	CHAIN GUIDE RIGHT	B	506455	68	1	1								
	CHAIN GUIDE (RIGHT REAR)	B	504649	69	1	1								
	CHAIN GUIDE LEFT	B	506456	70	1	1								
	HEIGHT ADJUSTMENT 3 3/4"	A	508748	71	2	2								
	SPACER - HEIGHT ADJ.	A	508747	72	8	8								
A	ROLLPIN, STEEL, 3/16 DIA x 1-1/8	A	503105	73	1	1								
A	SETSCREW, HEX SOCKET, CUP PT, STEEL, BLK OXIDE, 10-32 x 1/4 (400736 REF)			74	1	1								
				—										

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

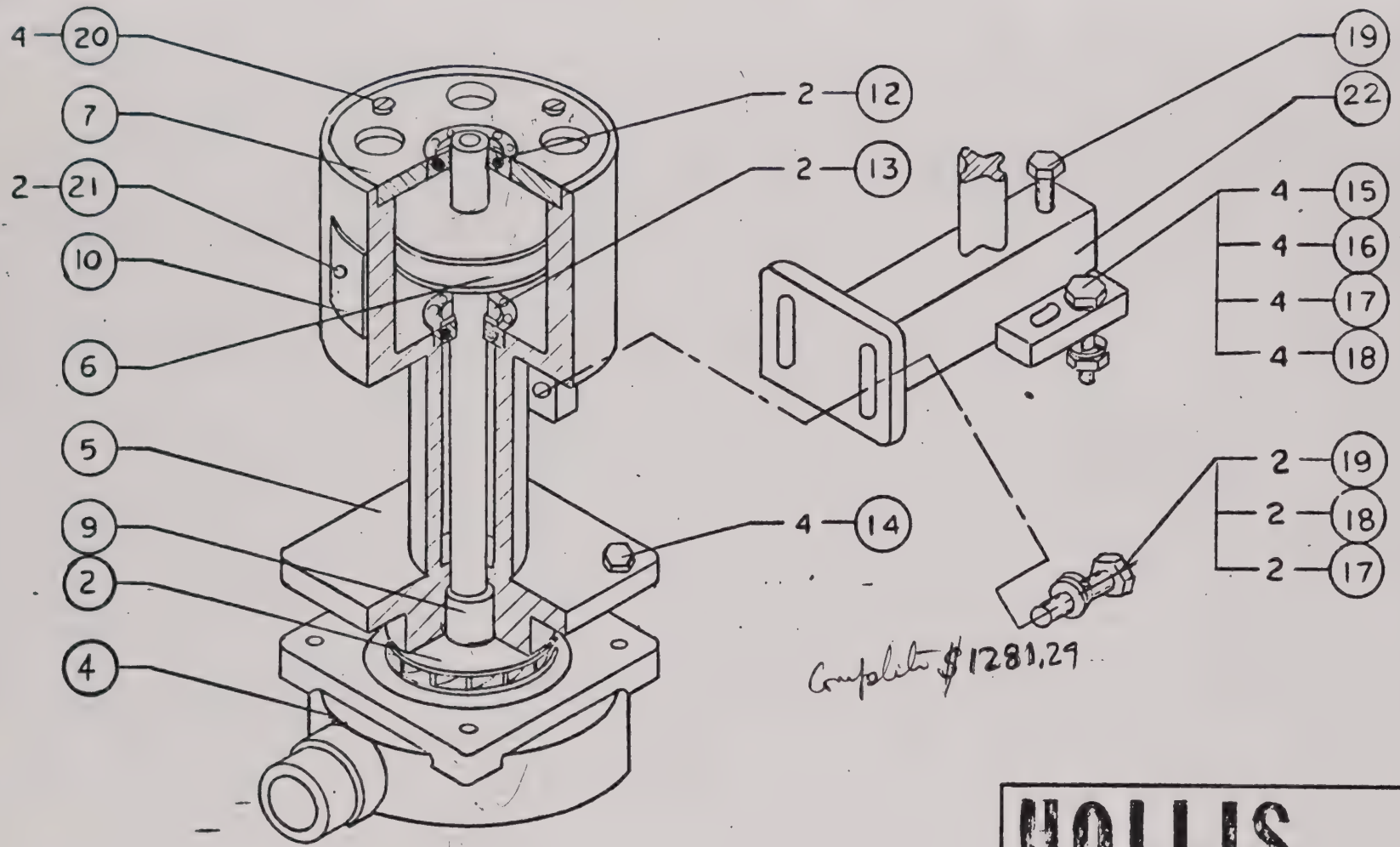
TITLE: FINGER CONVEYOR - TDL 16"

DWG NO. 203250 THRU 203259

REV A

SHEET 3 OF 3

BRUNING 20454 1



Complete $1281.29

HOLLIS
ENGINEERING INC.
NASHUA, NEW HAMPSHIRE

SOLDER PUMP ASSY

DR BY C BUBAR - 12-12-68

SIZE C 300611

REV. F

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 300 611	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASST
SOLDER PUMP ASS'Y 10" SYS TDB		300611		X									
			1										
IMPELLER ASS'Y	B	507919	2	1									
			3										
CASING	C	502497	4	1									
PUMP COLUMN 7" & 10"	D	501391	5	1									
PULLEY .670 BORE 4" O.D.	A	502080	6	1									
PUMP BEARING HOUSING TOP	C	501390	7	1									
			8										
BUSHING	A	500008	9	1									
NAMETAG, WARNING	A	502503	10	1									
			11										
BEARING	A	501246	12	2									
RETAINING RING	A	500358	13	2									
3/8-16 UNC x 5/8 LG HEX HD		400431	14	4									
5/16-18 UNC x1¼ LG HEX HD		400030	15	4									
5/16-16 UNC HEX NUT CAD PLT		400091	16	4									
5/16 WASHER, LOCK CAD PLT		400094	17	6									
5/16 WASHER FLAT CAD PLT		400095	18	6									
5/16-16 UNC x 1¼ SOC CAP SCR			19	3									
1/4-20 UNC x 3/4 LG SOC HD		400442	20	4									
RIVET, BLIND 1/8 DIA x .40 LG	A	502507	21	2									
PUMP MTG. BRACKET TDB	C	502106	22	1									
			23										
KEY 3/16 x 3/16 x 1" LG	A	503227	24	1									

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE SOLDER PUMP ASSEMBLY

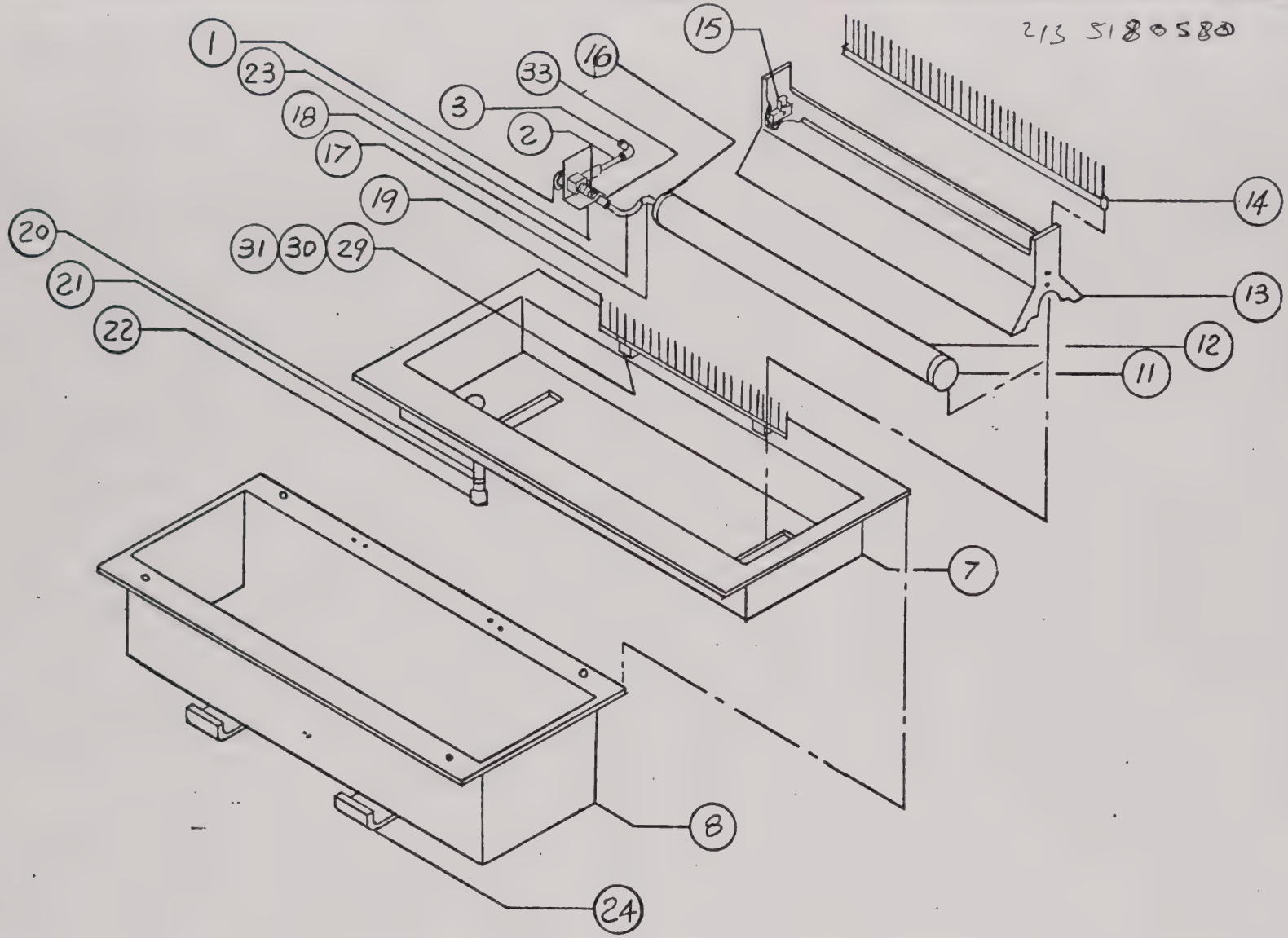
DWG NO. 300611

REV

SHEET 2 OF 2

BRUNING 20-11-1

213 5180580



HOLLIS ENG. INC. NASHUA, NEW HAMPSHIRE	TITLE TDB POLYETHYLENE FLUXER SERIES	DWG NO. 201221	REV

SHEET 1 OF 2

BRUNING 40-105 11083

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 201 221	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY	ASSY
TDL FLUXER POLY	A	201221		X									
VALVE	A	500129	1	1									
1/8 NPT NIPPLE 3 LG BLK IRON	A	500126	2	1									
1/8 NPT 90° ELBOW BLK IRON	A	500127	3	2									
			4										
			5										
TDC-14A			6										
FLUX POT TDL		504379	7	1									
SKIRT FOR FLUX POT TDL		504330	8	1									
			9										
			10	1									
END CAP BLANK	A	500198	11	1									
STONE DIFFUSING	A	504596	12	1									
NOZZLE FLUX	C	504382	13	1									
APPLICATOR BRUSH	A	506024	14	2									
BRUSH SUPPORT	A	504407	15	2									
END CAP THREADED	A	500197	16	1									
90° ELBOW NYLON	A	507422	17	1									
TUBING VINYL 5/16 OD. 3/16 ID	A	507423	18	1									
WIPE OFF BRUSH	A	504598	19	1									
TUBING VINYL 5/8 OD 1/2 ID	A	506699	20	1									
HOSE CLAMP	A	500298	21	2									
STOP COCK	A	500297	22	1									
BRACKET AIR PIPE	B	508192	23	1									
BRACKET, FLUX POT	B	508187	24	2									
			25										
NIPPLE, 1/8 NPT, 1" LG	A	500417	26	2									
			27										
			28										
BRUSH HOLDER	A	504403	29	2									
10-32 x 5/8 LG RD HD NYLON	A	504739	30	6									
10-32 HEX NUT NYLON	A	504743	31	6									
STEM ASSEMBLY	A	507419	32	1									
QUICK DISCONNECT BODY ASSY	A	507420	33	1									

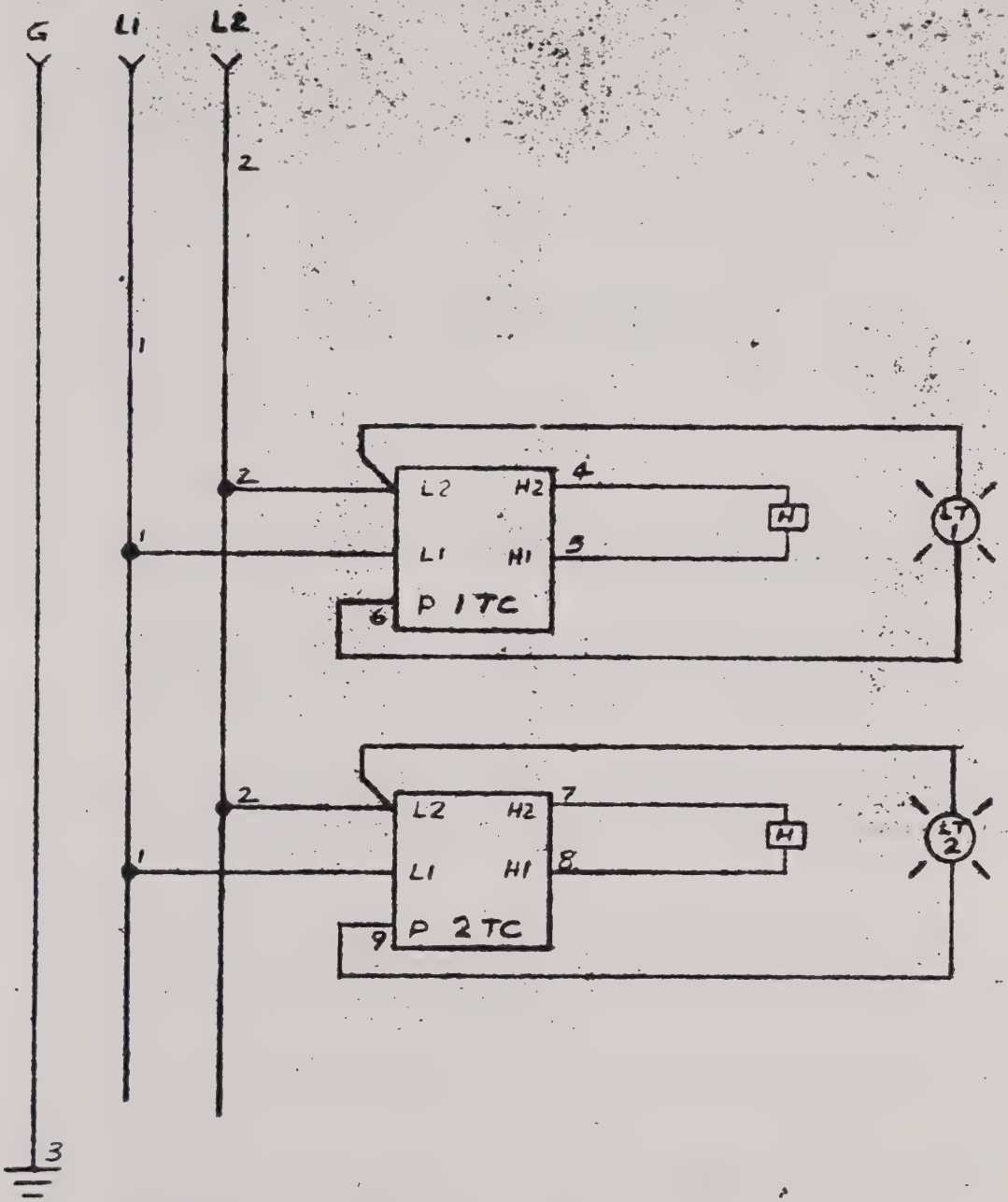
HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: TDL POLYETHYLENE FLUXER SERIES

DWG NO. 201221

REV

230VAC, 1PH, 50/60 HZ



MATERIAL	DR BY BM	DATE 1-26-78	HOLLIS ENGINEERING INC. NASHUA, NEW HAMPSHIRE		
HEAT TREAT	CHD BY	DATE			
FINAL PROTECTIVE FIN.	APPD BY APW	DATE 1-26-78			
	SCALE				
SURFACE FIN. UNLESS OTHERWISE NOTED ✓ ALL OVER	No. REQD		TITLE SCHEM. P/N 10-12 230 VAC, 1PH, 50/60 HZ NON-REMOTE		
	UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES				
BREAK SHARP EDGES	FRACTIONS ± 1/32	DECIMALS .XX ±.010 .XXX ±.005	ANGLES ± 1/2°	SIZE B	DWG. No. 303147	REV
USED ON / NEXT ASSY						

THE HOLLIS INSPECTION-MAINTENANCE SERVICE AGREEMENT

Hollis offers a program of planned preventive maintenance, on-the-spot training for operators, and emergency help if you need it.

We send factory service technicians to your plant at times prearranged with you for best results. Our men come to you with the latest in operating and maintenance information, and they pass it on to your people.

Your soldering system is inspected, lubricated, adjusted, and cleaned four times a year. Parts are replaced if necessary, with no additional charge for labor (and the parts themselves are free during the warranty period).

You may time the four visits for optimum effect. Have an emergency? Use one of the visits. Personnel turnover? Call in the Hollis technicians under your service agreement. Or time a visit to solve a soldering problem, train people, and check the system all at one time.

The price? Little more than an airline ticket and expenses. Just a fraction of its worth to you.

To initiate this service, please ask your Hollis representative for the agreement form. Sign and return copies 2 and 3. Keep the customer's copy as your record. You'll soon realize how Hollis service preserves your system.

DESCRIPTION	DWG SIZE	PART NO	ITEM NO.	ASSY 280 961	ASSY 280 962	ASSY 280 963	ASSY 280 964	ASSY 280 965	ASSY	ASSY	ASSY	ASSY	ASSY
A-K 10 IN TDC	A	280961		X									
A-K 12 IN TDC	A	280962			X								
A-K 14 IN TDC	A	280963				X							
A-K 16 IN TDC	A	280964					X						
AK 16 IN TDL	A	280965						X					
NOZZLE ASSY. 10 IN	B	381072	1	1									
PIPE CLAMP, AIR KNIFE	B	591715	2	2	2	2	2	2					
BRACKET, REG. MTG	A	509207	3	1	1	1	1	1					
BRACKET, LIMIT SWITCH MTG	A	510060	4	1	1	1	1	1					
SOLENOID VALVE	A	506856	5	1	1	1	1	1					
LIMIT SWITCH	A	506860	6	1	1	1	1	1					
NIPPLE, CLOSE 1/2 NPT	A	502975	7	1	1	1	1	1					
CONDUIT TEE, THREADED 1/2	A	506465	8	1	1	1	1	1					
COVER, CONDUIT	A	506223	9	1	1	1	1	1					
GASKET, NEOPRENE	A	506224	10	1	1	1	1	1					
AIR REGULATOR W/ GAUGE	A	506857	11	1	1	1	1	1					
QUICK DISCONNECT	A	504600	12	1	1	1	1	1					
			13										
NIPPLE, 1/4 NPT	A	504531	14	1	1	1	1	1					
BRACKET, SOLENOID MTG	A	581000	15	1	1	1	1	1					
			16										
			17										
SEALTITE 3/8" UM/FT	A	500044	18	6	6	6	6	6					
FITTING, 90°, 3/8" SEALTITE	A	500053	19	3	3	3	3	3					
TUBING, 1/4" ID TYGON UM/FT	A	599605	20	3	3	3	3	3					
FITTING, STRAIGHT 3/8" SEALTITE	A	500933	21	1	1	1	1	1					
CLAMP, HOSE	A	506169	22	2	2	2	2	2					
ELBOW, STREET 90° 1/4 NPT	A	504558	23	2	2	2	2	2					
ELBOW, 1/4 NPT TO 1/4 ID HOSE	A	597130	24	1	1	1	1	1					
			25										
			26										
1/4 LOCK WASHER			27	12	12	12	12	12					
1/4 FLAT WASHER			28	24	24	24	24	24					

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE AIR KNIFE ASSY

DWG NO 280961 THRU 280970

REV

SHEET 1 OF 2

BRUNING 40-105 20464-1

DESCRIPTION	DWG SIZE	PART NO.	ITEM NO.	ASSY 280 961	ASSY 280 962	ASSY 280 963	ASSY 280 964	ASSY 280 965	ASSY	ASSY	ASSY	ASSY	ASSY
1/4 -20 HEX NUTS			29	6	6	6	6	6					
1/4 - 20 x 1 1/2" SOC HD CAP SCR			30	2	2	2	2	2					
1/4 - 20 x 1 1/4" HEX HD BOLT			31	4	4	4	4	4					
10 - 24 x 1/2" PAN HD SCR			32	2	2	2	2	2					
#10 FLAT WASHER			33	8	8	8	8	8					
#10 LOCK WASHER			34	6	6	6	6	6					
10 - 24 x 1 1/2" PAN HD SCR			35	2	2	2	2	2					
			36										
10-32 x 1/2" PAN HD SCR			37	2	2	2	2	2					
			38										
NOZZLE ASSY 12" IN.	B	381073	39		1								
NOZZLE ASSY 14 IN	B	381074	40			1							
NOZZLE ASSY 16 IN	B	303112	41				1	1					
ASSY DWG 10"-16" FLUXER	C	SK-3620		REF	REF	REF	REF	—					
SCHEMATIC	A	381070		REF	REF	REF	REF	REF					

HOLLIS ENG. INC.
NASHUA, NEW HAMPSHIRE

TITLE: AIR KNIFE ASSY

DWG NO 280961 THRU 280970

REV

SHEET 2 OF 2

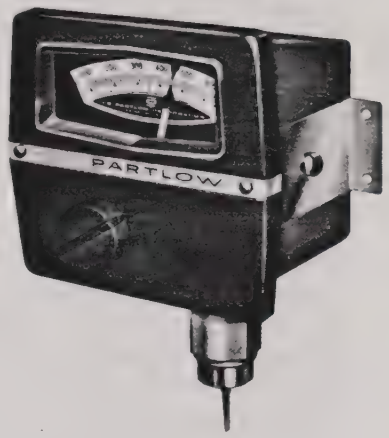
BRUNING 10-105 20464-1

PARTLOW

INSTRUCTIONS

Single-Switch Indicating Temperature Control

MODEL MFS



The **Model MFS** is a single-switch indicating temperature controller. The instrument is supplied with either a two-wire (N.O. or N.C.) or a three-wire (S.P.D.T.) snap-acting switch.

INSTALLATION

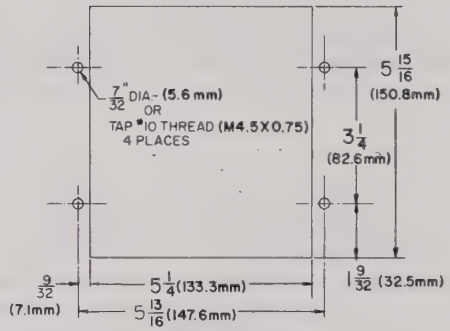
LOCATION

1. Locate control far enough from source of heat to be hand-held comfortably. Do not subject instrument body to temperatures above 125°F or below −30°F.
2. Locate control where it will be as free from vibration as possible.

MOUNTING

The Model MFS is shipped with wall-mounting brackets already fastened to sides of case (see Dimensional drawing, pg. 3). If the control is to be flush-mounted, remove brackets, replace screws in holes and proceed as follows:

1. Cut panel opening 5¼"W x 5¹⁵⁄₁₆"H, drill ⁷⁄₃₂" clearance holes or tap for No. 10 flat-head screws (see diagram).
2. Use rear conduit hole (hole spotted if not ordered factory-drilled—see Dimensional drawing, pg. 3) and make necessary electrical connections using short section of flexible cable or conduit (see WIRING).



PANEL CUT-OUT FOR FLUSH MOUNTING

3. Remove instrument setting knob and front cover, insert element and element head into opening and tip in the control.

SPECIFICATIONS

DIMENSIONS	6¾"W x 6⁵⁄₁₆"H x 4"D
WALL MOUNTING	Brackets furnished
FLUSH MOUNT CUT-OUT	5¼"W x 5¹⁵⁄₁₆"H
SWITCH TYPES	Two-wire: Normally-open or normally-closed Three-wire: Single-pole double-throw
SWITCH SENSITIVITIES	Normal — 1% of element range Super-sensitive — ½% of element range
ELECTRICAL HOOKUP	Terminal block accessible through top cover hatch
CONDUIT OPENINGS	⅞" dia. openings on each side of case for ½" electrical fittings; drill-guide hole spotted in rear of case for flush-mount installations
ELECTRICAL RATING	50 VA, inductive; 500 VA, non-inductive; 250 V max., AC only

4. Fasten instrument to panel using the four mounting holes B located in control flange; replace cover and knob.

ELEMENT INSTALLATION

1. Locate the thermal sensing bulb in the most agitated part of the controlled medium.
2. Completely immerse sensing bulb in medium (when U or Y-type bulb, note separation coupling between bulb and capillary).
3. Do not bend capillary to less than ½" radius and never bend too close to element bulb or element head (two finger-widths distant).
4. Anchor excess capillary securely to prevent vibration damage.
5. If bulb is to be subjected to corrosive or scouring conditions, it should be protected by a thermal well, separable socket or other protective material.
6. Bulbs may be elevated up to 40 feet above the instrument without affecting calibration. For elevations over 40 feet, consult factory.

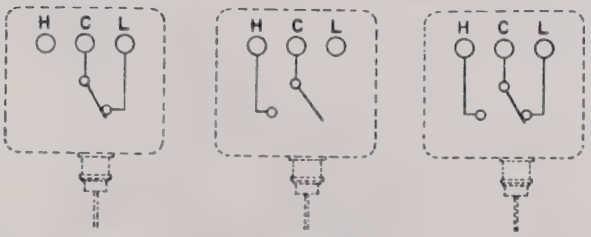
STUFFING BOX INSTALLATION (if necessary)

Overtightening of 21-T-105 steel or stainless steel stuffing boxes can damage the thermal element by restricting the capillary bore. To prevent damage, the stuffing box gland nut should be turned ½ to ¾ of a revolution from a finger-tight position. This is equivalent to a torque of 65 to 100 inch-pounds for steel and 130 to 180 inch-pounds for stainless steel.

WIRING

Check applicable electrical codes, ordinances and regulations regarding use of conduit, etc. **If acceptable, make connections using short section of flexible cable or conduit.**

1. Remove control top cover hatch (two screws), exposing connection terminal block.
2. Note terminal block is labeled H, C and L. H represents normally-open, C—common and L—normally-closed. Terminal block is adaptable to either 2-wire or 3-wire hookup—in 2-wire hookup one terminal is not used.
3. See diagrams below and make necessary electrical connections, replace top cover hatch.



2-WIRE NORMALLY-CLOSED SWITCH | 2-WIRE NORMALLY-OPEN SWITCH | 3-WIRE SPDT SWITCH

NOTE: Above diagrams illustrate condition of switch when temperature is below set point.

PRE-START-UP

The control should be checked against a test thermometer of known accuracy before being put into service. As with any precision instrument, minor adjustments may be necessary after shipment and installation. For Checking Temperature and Re-zeroing procedures, see MAINTENANCE section.

OPERATION

Control temperature is established by turning the cover-mounted knob and moving the red set pointer along the scale to the desired setting. This positions a single snap-acting switch in the instrument at the control point. The black indicating pointer moves up or downscale in response to the expansion or contraction of mercury in the thermal element. When the indicating pointer moves into line with the red set pointer, the snap-acting switch is actuated and opens or closes the circuit controlling the heating or cooling input to the appliance.

MANUAL RESET VERSION

When the MFS is equipped as a temperature high-limit device containing a No. 8, 9 or 10 manual reset switch (MF8, MF9 or MF10), process temperature must be allowed to drop back below set point before the switch can be reset. Then reset by turning the setting knob and running the red set pointer upscale to the stop—and returning it back to the desired temperature setting.

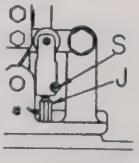
MAINTENANCE

CHECKING TEMPERATURE

1. Use test thermometer of known accuracy.
2. Position test thermometer sensing bulb or probe adjacent to the Partlow thermal sensing bulb.
3. Turn knob and position red set pointer to process temperature or above.
4. After allowing adequate time for temperature to stabilize, compare test thermometer reading with reading of black indicating pointer.
5. If the two readings do not agree, instrument should be re-zeroed.

RE-ZEROING

1. Be certain process temperature is stabilized.
2. Move red set pointer to temperature indicated by test thermometer.
3. Remove setting knob and instrument cover; loosen set screw S (see diagram).
4. Using 3/16" wrench provided, turn shaft J accordingly until black indicating pointer reading agrees with test thermometer reading. Tighten set screw "S".



5. Check adjustment by allowing temperature to stabilize and comparing readings. Repeat above steps if necessary.

SWITCH REPLACEMENT

1. Turn off power to instrument.
2. Remove setting knob and cover.
3. Remove the two screws holding switch to switch arm. Take out faulty switch and remove wires.
4. Replace wires on new switch, making sure wires are replaced on same terminals as removed, and reassemble in mechanism.
5. Replace cover, knob, and turn on power.

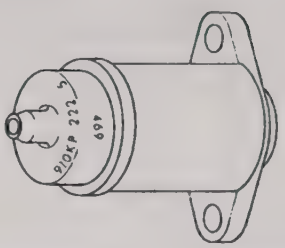
NOTE: Following switch replacement, it may be necessary to make an adjustment to switch actuation screw E (see diagram). If, during normal process temperature cycling, the black indicating pointer registers a constant differential over or under the red set pointer, lengthen (lowers indicated temperature) or shorten (raises indicated temperature) switch actuation screw E until corrected.

BRAKE TIGHTENING

With use, setting shaft brake may require tightening. If the brake is too loose, the overtravel movement of the black indicating pointer will tend to drag the red set pointer upscale from its set position. To tighten brake, turn adjustment screw U clockwise. **Do not over-tighten.**

ELEMENT IDENTIFICATION

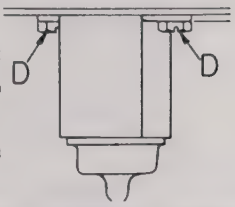
An element designation number is stamped on the **bottom** of the element head. This is a coded description of element specifications and should be used whenever a replacement element is ordered. The last digit (or digits) of the designation number indicates the length of the element in feet. The number appearing on the **side** of the element head is the element age code, which may be required in establishing warranty.



ELEMENT REPLACEMENT

To change a thermostatic element:

1. Withdraw screws D and drop element from instrument body.
2. Install new element and tighten screws D.

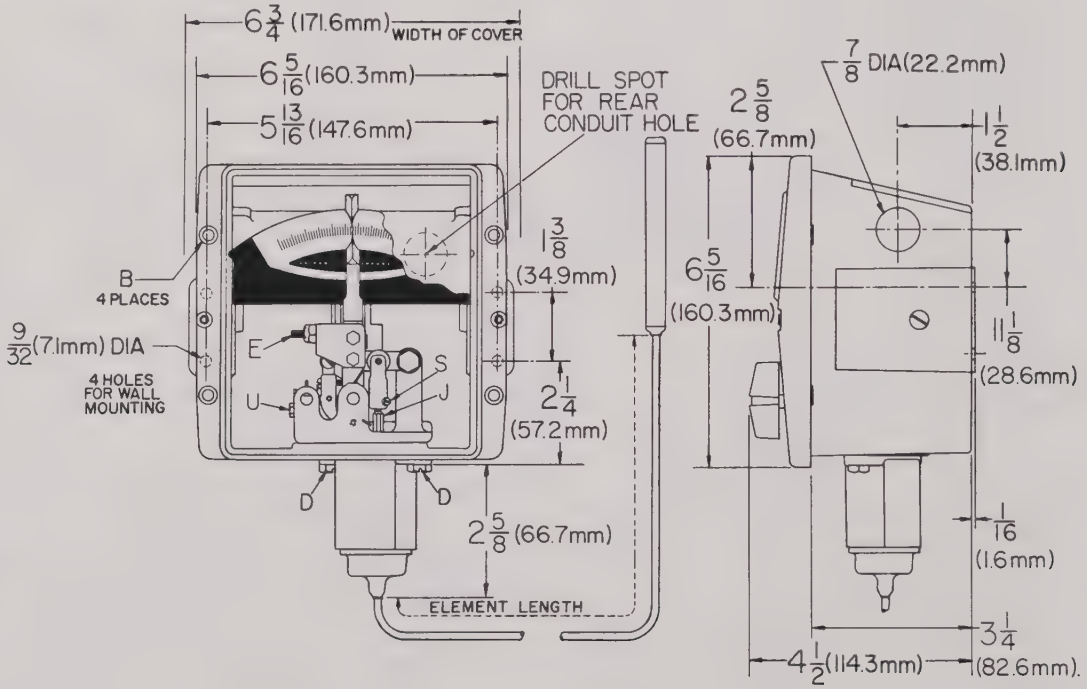


NOTE — After element replacement, temperature setting should be checked, as explained under CHECKING TEMPERATURE. Re-zeroing may be necessary.

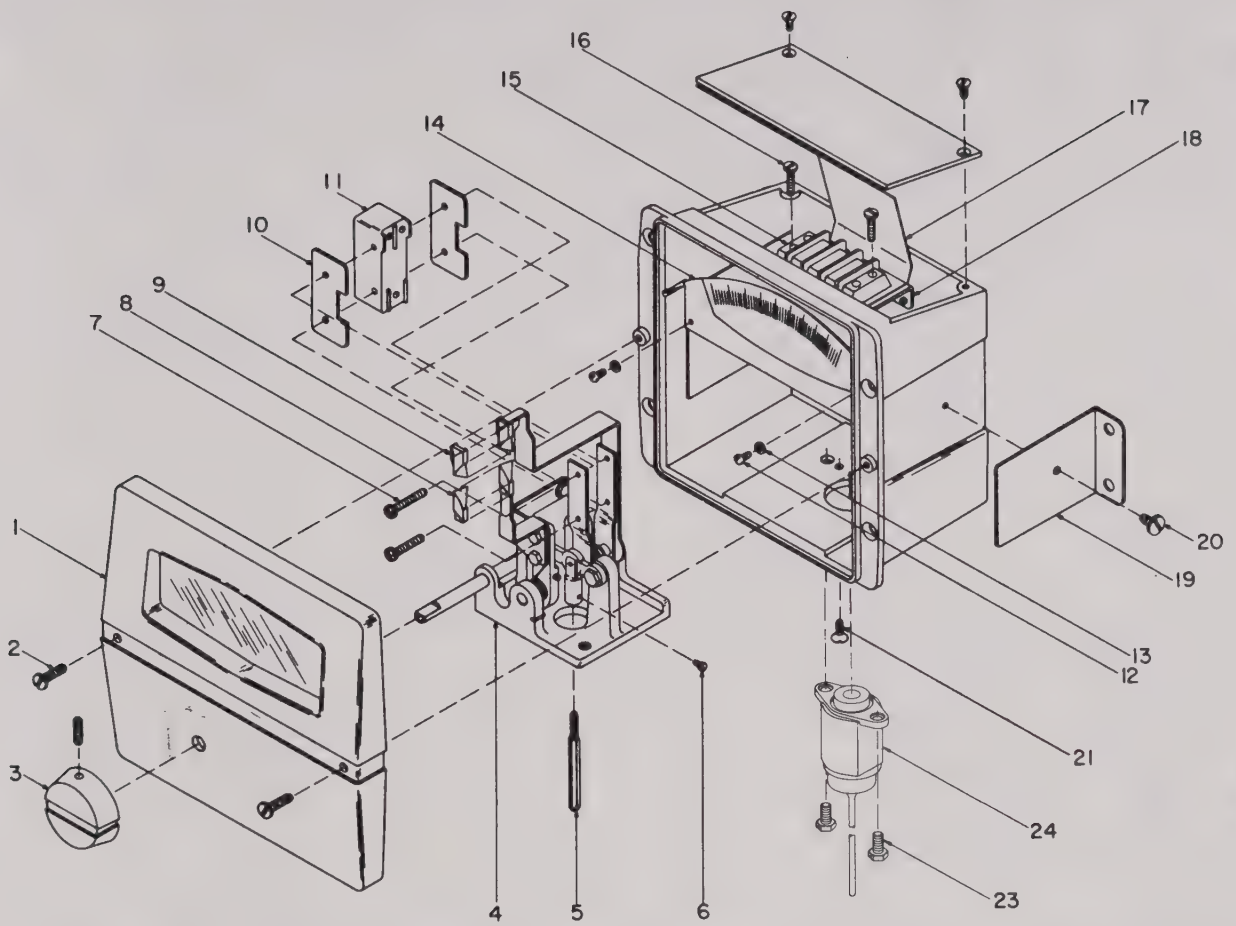
CAUTION

The inside mechanisms, particularly the inside of the element housing, should **never** be oiled. However, if the instrument interior is subject to corrosion or gunking conditions, the linkage should be sprayed periodically with corrosion-inhibiting **CRC3-36. Use only CRC3-36, as other lubricants may cause buildup and sticking of internal parts.**

DIMENSIONS



EXPLODED VIEW AND REPLACEMENT PARTS LIST



	DESCRIPTION	QTY. REQ.	PART NO.
1.	Cover Assembly	1	MFS-S12
	Cover	1	MFS-43
	Cover Glass	1	MFS-57
	Cover Glass Screw	4	#4-40 x 3/16" Rd. Hd.
	Cover Glass Washer	4	MFS-19
	Cover Glass Gasket	1	MFS-58
2.	Cover Screw	2	#8-32 x 3/16" Bind. Hd.
3.	Knob	1	MFS-49
4.	Mechanism Assembly (Includes switch, terminal block, wiring)	1	MFS-S9
5.	Push Rod	1	MFS-63
6.	Push Rod Set Screw	1	#4-36 x 3/16" Fil. Hd. SST
7.	Switch Holding Screw	2	#6-32 x 15/16" Pan. Hd. Sems
8.	Indicating Pointer Tip	1	LF-12
9.	Setting Pointer Tip	1	LF-11
10.	Switch Insulator	2	MA-35

	DESCRIPTION	QTY. REQ.	PART NO.
11.	Control Switch	1	As Specified
12.	Dial Screw	2	#4-40 x 1/4" Rd. Hd.
13.	Dial Washer	2	MFS-21
14.	Dial Scale	1	As Specified
15.	Terminal Block	1	AHB 3TB3, or equal
16.	Terminal Block Screw	2	#6-32 x 3/16" Bind. Hd.
17.	Terminal Block Insulator	1	MFS-48
18.	Terminal Block Mounting Bracket	1	MFS-56
	Screws	2	#6-32 x 1/4" Bind. Hd.
	Spring Lock Washer	2	#6
19.	Mounting Angle	2	ZFS-8
20.	Mounting Angle Screw	2	#10-32 x 5/16" Bind. Hd.
21.	Mechanism Holding Screw	1	#8-32 x 3/8" Flat Hd.
23.	Element Flange Screw	2	MFS-67
24.	Thermal Element	1	As Specified (Requires "L" Plunger)

We warrant our products to be free from defects in material and workmanship when leaving our Factory; provided, however, that our liability under this warranty is limited to repairing or replacing without charge F.O.B. our Factory, any defective product if returned to our Factory transportation prepaid within one year from date of shipment from our Factory; and provided further that in no event shall we be liable for consequential or other damages. No other representation or warranty, either expressed or implied, is made.

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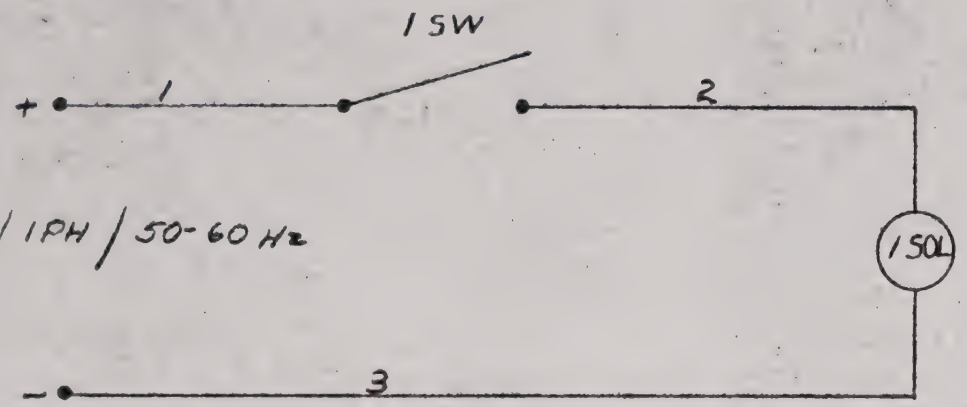


SYMBOL	PT NO.	DESCRIPTION	QTY
1SW	506860	LIMIT SWITCH	1
1SOL	506856	SOLENOID VALVE	1

LTR	DESCRIPTION	DATE BY

REVISIONS

MATERIAL

FINAL PROTECTIVE FIN.

SURFACE FIN. UNLESS OTHERWISE NOTED ✓ ALL OVER

BREAK SHARP EDGES

USED ON	NEXT ASSY
	280961

DR BY GMD DATE 6-15-78

CHD BY DATE

APPD BY DATE

SCALE

UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES

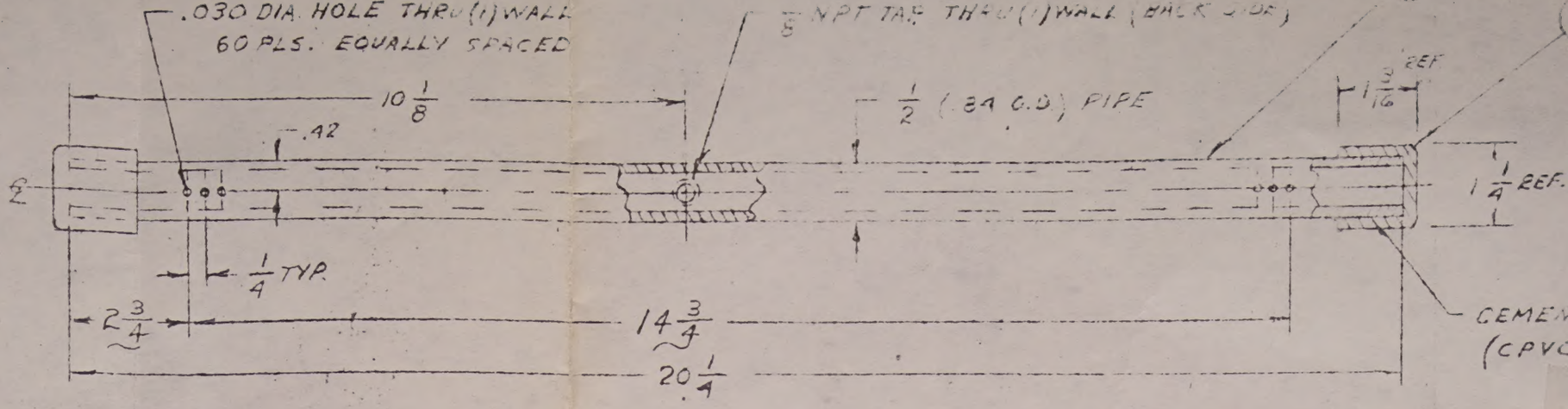
FRACTIONS	DECIMALS .XX	DECIMALS .XXX	ANGLES
± 1/64	±.01	±.005	± 1/2°

HOLLIS ENGINEERING INC.
NASHUA, NEW HAMPSHIRE

TITLE: SCHEMATIC AIR KNIFE

SIZE	DWG. No.	REV.
A	381070	

BRUNING 40-107 28082-3



ITEM NO.	PART NO.	DWG SIZE	DESCR
3	509272	A	ELL-
2	509271	A	END
1	581013	B	NOZZ

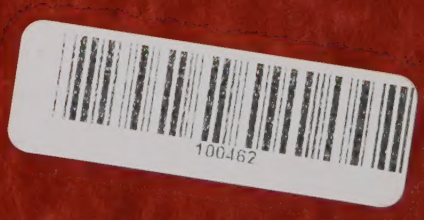
MATERIAL	DR BY		DATE
HEAT TREAT	CHD BY		DATE
FINAL PROTECTIVE FIN.	APPD BY		DATE
SURFACE FIN. UNLESS OTHERWISE NOTED √ ALL OVER	SCALE	1/2 X	
BREAK SHARP EDGES	No. REQD		UNLESS OTHERWISE NOTE DIMENSIONAL TOLERANC
			DECIMALS

ITEM NO.	PART NO.	DWG SIZE	DESCRIPTION	NO REQ'D
3	509272	A	ELL-HOSE 90° FITTING	1
2	509271	A	END CAP, 1/2 PVC PIPE	2
1	581013	B	NOZZLE (MF 509273)	1

MATERIAL	DR BY		DATE
HEAT TREAT	CHD BY		DATE
FINAL PROTECTIVE FIN.	APPD BY		DATE
SURFACE FIN. UNLESS OTHERWISE NOTED √ ALL OVER	SCALE	1/2 X	
	No. REQD		UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES

HOLLIS
ENGINEERING, INC.
NASHUA, NEW HAMPSHIRE

TITLE NOZZLE ASS'Y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